THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY

FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS ≤ 8

Dissertation submitted in partial fulfillment of the requirements for the degree of

M.Ch. BRANCH –II

NEUROSURGERY

Examination in AUGUST 2013

INSTITUTE OF NEUROLOGY
MADRAS MEDICAL COLLEGE
CHENNAI – 3.

CERTIFICATE

This is to certify that the dissertation entitled is **"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS ≤ 8"** the bonafide original work of **Dr.M.PRABHU** in partial fulfillment of the requirements for Branch II, M.Ch Neurosurgery, examination of **THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY** to be held in August 2013.The period of post graduate study and training was from August 2010 – August 2013.

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DECLARTION

I solemnly declare that this dissertation **"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS ≤ 8"** was prepared by me in the Institute of Neurology, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai under the guidance and supervision of Professor of Neurosurgery, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai between 2010 and 2013.

This dissertation is submitted to The TamilnaduDr.M.G.R. Medical University, Chennai in partial and fulfillment of the university requirements for the award of degree of M.Ch. Neurosurgery.

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ACKNOWLEDGEMENTS

I thank the successive Deans, Madras Medical College and Rajiv Gandhi Government General Hospital for permitting to carry out this study and also for providing necessary facilities.

I am very much thankful to **Prof.K.DEIVEEGAN,M.S., M.Ch.,** Professor of Neurosurgery, who initiated and supervised this study.

I thank my teachers **Prof.K.DEIVEEGAN, Prof.V.SUNDAR, Prof.V.G.RAMESH, Prof.S.SUNDARAM, Prof.K.MAHESHWAR, Prof.S.D.SUBBIAH, Prof.RANGANATHAN JOTHI, Prof.G.S.JAGAN NARAYANA, Prof.S.SYAMALA, Prof.K.SEKAR,** under whom I had great previllege of working as a postgraduate student receiving their constant advice and valuable guidance. I thank my professors towards their immense support and encouragement in preparing this dissertation.

My sincere thanks and gratitude to all the Assistant Professors of Neurosurgery for their guidance and co-operation throughout this study. I thank all My Patients and their relatives for participating in the study.

INDEX

ABBREVIATIONS

ABD	:	Abdomen
CT	:	Computed Tomography
DAI	:	Diffuse Axonal Injury
DEM	:	Dolls Eye Movement
EDH	:	Extra Dural Hematoma
GCS	:	Glasgow Coma Scale
GOS	:	Glasgow Outcome Scale
Hb	:	Hemoglobin
LOC	:	Loss of Consciousness
MRI	:	Magnetic Resonance Imaging
SDH	:	Sub Dural Hematoma
TBI	:	Traumatic Brain Injury
tSAH	:	Traumatic Sub Arachnoid Haemorrhage
MVA	:	Motor Vehicle Accident
TA	:	Train Accident

INTRODUCTION

Traumatic brain injury (TBI) is one of the major and very important public health and socioeconomic problem all over the world. The incidence of TBI is increasing sharply and in particular due to increasing motor vehicle use in our country. TBI will over take many diseases as the major cause of death and disability by the year 2020.Head injury is a collective term and includes injury to the scalp and face such as lacerations and abrasions, which may be present without underlying brain trauma. TBI is a heterogeneous disorder with different signs and symptoms.

Brain damage results from external forces, as a consequence of direct impact, rapid acceleration, a penetrating object or blast waves from an explosion. The nature, intensity, direction and duration of these forces determine the pattern and extent of damage.

TBI can be divided into 2 phases.

1. Primary brain injury-

    -injury sustained at the time of impact

2. Secondary brain injury

-injury to brain secondary to primary injury

- It is important to differentiate between risk factors. Direct causative effect on out come eg: Cerebral edema. Prognostic factors – Which are associated with outcome, but aren't causative eg: Markers of Injury severity are assessed with GCS Scoring and clinical assessment like pupillary response and DEM.

- The outcome in severe head injury patient is very poor, hence a study has been conducted in TBI patients with GCS ≤8 and factors that contribute for the outcome are analysed.

AIM OF THE STUDY

- To Analyse the various factors in severe Head Injury Patients (GCS≤8)
- To identify how they influence the outcome in those patients
- To study each factor in detail in relation to Glasgow outcome scale (GOS) and predict Best & worst outcome with each factor
- To determine if there is any modifiable risk factor that can improve the outcome in severe head injury patients

REVIEW OF LITERATURE

Mwang'ombe NJ, Kiboi J.et al[9] 2001, studied the factors influencing the outcome of severe head injury. It was a retrospective study in Kenya including Six hundred and seventy seven patients with severe head injuries who were seen at Kenyatta National Hospital , Three hundred and eighty one patients died while undergoing treatment, 56.2% overall mortality. Age specific mortality was 35.7% in patients below 13 years, 44% in age group 14-25 years, 56% in age group 26-45 years. The admission Glasgow coma scale (GCS) was recorded in 637 patients. Patients with admission GCS of 3-4 had a mortality of 88%, those with GCS 5-6 had a mortality of 60% and those with admission GCS 7-8 had a mortality of 52%. Ninety per cent of the patients who had bilaterally dilated pupils not reacting to light on admission died and 66% of the patients with bilaterally constricted pupils at the time of admission died. Only 20% of patients with severe head injury who had normal pupillary reaction to light at the time of admission died. Eighty five per cent of the patients with systolic BP of less than 90 mmHg on admission died while 60% of those with systolic BP greater than 120 mmHg died and they concluded that factors associated with poor outcome in severe head injury patients were

age, admission GCS, admission blood pressure (systolic), presence of other associated injuries and pupillary reaction to light.

Hukkelhoven CW[5] 2005 - Predicting outcome after traumatic brain injury developed validation of a prognostic score based on 2269 patients from two multi-center clinical trials and developed models for each outcome with logistic regression analysis. They included seven predictive characteristics-age, motor score, pupillary reactivity, hypoxia, hypotension, computed tomography classification, and traumatic subarachnoid hemorrhage. The models were validated internally with bootstrapping techniques.

Yuan F et al[21], 2012 in his journal - Predicting outcomes after traumatic brain injury: the development and validation of prognostic models based on admission characteristics. Retrospectively collected data and developed prognostic models for outcome. They developed four prognostic models based on admission predictors with logistic regression analysis. The performance of models was assessed with respect to discrimination and calibration. Logistic regression showed that age, pupillary reactivity, motor Glasgow Coma Score, computed tomography characters, glucose, hemoglobin, D-dimer, serum calcium, and

intracranial pressure were independent prognostic factors of outcome.

GCS

GCS was developed by Teasdale[13,16,17,18] & Jennett[6,7,8] in 1974 as an objective measurement of level of consciousness.

Scoring System of the Glasgow Coma Scale

TEST	SCORE
EYE OPENING (E)	
Spontaneous	4
Open to voice	3
Open to pain	2
None	1
BEST MOTOR RESPONSE (M)	
Following commands	6
Localizing to painful stimulus	5
Flexion-withdrawal to painful stimulus	4
Flexor/decorticate posturing to painful stimulus	3
Extensor/decerebrate posturing to painful stimulus	2
None	1
BEST VERBAL RESPONSE (V)	
Oriented conversation	5
Confused/disoriented conversation	4
Inappropriate words	3
Incomprehensible sounds	2
None*	1
MAXIMUM SCORE (E + M + V)	**15**

*Patients who are intubated receive a verbal score of "T," and the scale is adjusted to 3T-11T.

GOS

The Glasgow Outcome Scale (GOS) is a scale so that patients with brain injuries, such as cerebral traumas can be divided ino groups that allow standardised descriptions of the objective degree of recovery. The first description was done in 1975 by Jennett[7,8] & Bond.

Glasgow Outcome Scale

SCALE	GOS	SCALE	GOSE
1	Dead	1	Dead
2	Vegetative	2	Vegetative
3	Severe disability (conscious but dependent)	3	Lower severe disability
		4	Upper severe disability
4	Moderate disability (independent but disabled)	5	Lower moderate disability
		6	Upper moderate disability
5	Good recovery (can resume normal activities)	7	Lower good recovery
		8	Upper good recovery

GOS, Glasgow Outcome Scale; GOSE, 8-point extended GOS.

In TBI it is better to quantify prognostic effects across the full range of the GOS rather than after dichotomization into a binary variable. For this purpose, proportional odds methodology is

appropriate. The 8-point extended GOS (GOSE) has been introduced to increase the sensitivity of outcome assessment. The use of a structured interview is further advocated to obtain more consistency in outcome assignment. In severe TBI, the outcome distribution according to the 5-point GOS is U shaped, with most patients either in the lowest (dead) or highest (good recovery) categories. This U-shaped distribution of outcome has promoted the

common practice of dichotomizing the GOS for analysis. There is still insufficient knowledge on how introduction of the GOSE may have changed the outcome distribution. It should be noted that the potentially increased sensitivity of the GOSE is totally lost when this is again dichotomized to a binary scale.

Braakman et al[7,8] 1980,Description of Study: Retrospective analysis of 305 consecutive head-injured Dutch patients.The relation333ship between age and mortality after 6 months shows an increasing mortality rate with increasing age.There is a strong association with the initial GCS score and outcomes, many investigators studied the P value of the Initial GCS score using logistics technique.

Genneralli et al[3,4,6] in 1994, A multi-center analysis of the major trauma outcome study data base. The relations ship between admission GCS score and mortality showed an exponential relationship with a marked increase in mortality in patients with GCS < 9.

AGE

A prospective study of age and outcome from the TCDB revealed that patients older than 60 had a significantly worse outcome. Six months after severe head injury, 92% were dead, vegetative, or severely disabled. Four Class I studies demonstrated a mortality of greater than 75% in severely brain injured patients older than 60. The critical age threshold for worsening prognosis appears to be above 60 in a review of Class I and II studies.

PUPILS

The parasympathetic, Pupillo constrictor, Light reflex pathway mediated by the 3rd cranial nerve is anatomically adjacent to brain stem areas controlling consciousness and the medial temporal lobe. Therefore, damage to midbrain 3rd nucleus (or) efferent 3rd nerve by temporal lobe compression produced dilation of pupils

If the damage (or) compression is significant the pupils will be fixed to light reflex.

This pupillary light reflex and size of the pupil has traditionally been used as a clinical parameter in assessing transtentorial herniation as a prognostic factor.

The use of the pupillary size and Light Reflex are, therefore, indirect measurement of dysfunction to pathways sub serving consciousness and thus an important clinical parameter in assessing outcome from traumatic coma.

Acute measurement of pupillary dilatators (or) constrictors response or the duration of the response has not been performed in studies on traumatic brain injured individuals.

The following is recommended

- Pupillary light reflex for each eye should be used as a prognostic parameter.
- The duration of pupillary dilation and fixation should be documented.
- A pupillary size greater than 4 mm is recommended as the measure for a dilated pupil.17
- A fixed pupil should be defined as no constrictor response to bright light.

- Right or left distinction should be made when the pupils are asymmetric.
- Hypotension and hypoxia should be corrected before assessing pupils for prognosis.
- Direct orbital trauma should be excluded.
- Pupils should be reassessed after surgical evacuation of intracranial hematomas.

Pupils were studied in 2 headings.

- Symmetry
- Light reaction

Symmetry pupil - Both equal in size

A symmetry pupil - Anisocoria

PROGNOSTIC VALUE OF CT FINDINGS

Class I and Class II studies show presence of abnormalities on CT to have a positive predictive value of 77%-78% with respect to unfavorable outcome in series of patients with severe head injury as defined by a GCS score of 8 or less. However, both studies already have an incidence just over 70% of unfavorable outcome in

the overall population. Favorable outcomes are reported by Narayan, et al[10]. (1981), Van Dongen, et al[19,20]. (1983), Holliday[1], et al. (1982), and Lobato, et al[11]. (1986), in 76%-83% of patients with a normal CT scan on admission. Marshall, et al[12]. (1991), in the report on the TCDB find 62% favorable outcome in patients with a normal CT scan on admission (diffuse injury I). This lower percentage with respect to the other series reported is probably caused by the earlier determination of outcome (e.g., on discharge). Lobato, et al[11]. (1986), however, showed that in approximately one third of the patients with an initial normal CT brain , new lesions may develop on subsequent CT examination.

MATERIALS AND METHODS

This study was conducted at Department of Neurosurgery, MADRAS INSTITUTE OF NEUROLOGY, Rajiv Gandhi Government General Hospital, Chennai-600 003. Tamilnadu, is one of the most pioneers in the establishment of neurosurgical centre in our country.

We have a large separate ward for trauma patients. All facilities and specialties were available round the clock. All head injury patients were received in trauma ward and were immediately assessed by the triage team of doctors(general surgeons, neuro surgeons, orthopaedic surgeons) .

STUDY PATTERN

- This is a prospective type of study
- 350 consecutive acute severe head injury patients with GCS≤8 who were admitted in emergency head injury ward were **included** in the study
- All admitted head injury patients, with GCS 9 and above, paediatric patients with less than 14 yrs of age, patients treated at outside hospitals were **excluded** from the study.

INCLUSION CRITERIA

Patients with GCS≤8 who were admitted during the study period were All adult severe head injury included.

EXCLUSION CRITERIA

- All adult head injury patient with GCS 9 and above were excluded in this study
- All Paediatric patients with age 14 and below were excluded
- Those patients who were treated outside (Private hospitals) were excluded.
- patients with other severe systemic Injuries and died in trauma ward before transferring to Neuro surgical side were excluded.
- Only severe head injury patients were taken into this study group so, mild and moderate head injury patient were excluded from the study.

The following factors were studied on these patients and analysed both descriptively and statistically.

- Mode of injury

- Motor vehicle accident
- Train accident
- Fall
- Assault

- Time Interval -(Time between the injury and hospital admission)
- Age
- Sex
- GCS score on Admission
- Motor response

- M1 - No response
- M2 - Decerebrate Posture
- M3 - Decorticate posture
- M4 - Flexion to pain
- M5 - Localising
- M6 - Obeying

- Pupils Rt Lt

- Symmetry

- Light reaction

- DEM

    - Absent

    - Impaired

    - Present

- Associated injuries

- CT findings

- Glycemic status

- Hemoglobin Level

- COAG profile

- Management

The above factors were analyzed with the GOS.

Appropriate statistics (e.g., multivariate analysis) used to include adjustment for prognostic variables and positive predictive value and strong association of a data analyzed using.

- Valid percentage
- Cumulative percent
- Chi square test
- Cross tabulation

OBSERVATIONS AND RESULTS

The collected data were grouped and results were analyzed as follows.

GLASGOW OUTCOME SCALE

Table 1: Glasgow Outcome Scale

Score	outcome	No of patients	%
5	Good recovery	42	12
4	Moderate	49	14
3	Severe disability	68	19.4
2	Persistent Vegetative State	21	6
1	Death	170	48.6
TOTAL		**350**	**100%**

In this study on 350 patients, the above table showed the overall outcome of the severe head injury patients. 170 people died (48.6%) followed by 68 patients (19.4%) who had severe disability, 6% of study population became vegetative state, Good recovery was in 12% of study population while 14% had a moderate recovery.

GLASGOW OUTCOME SCALE

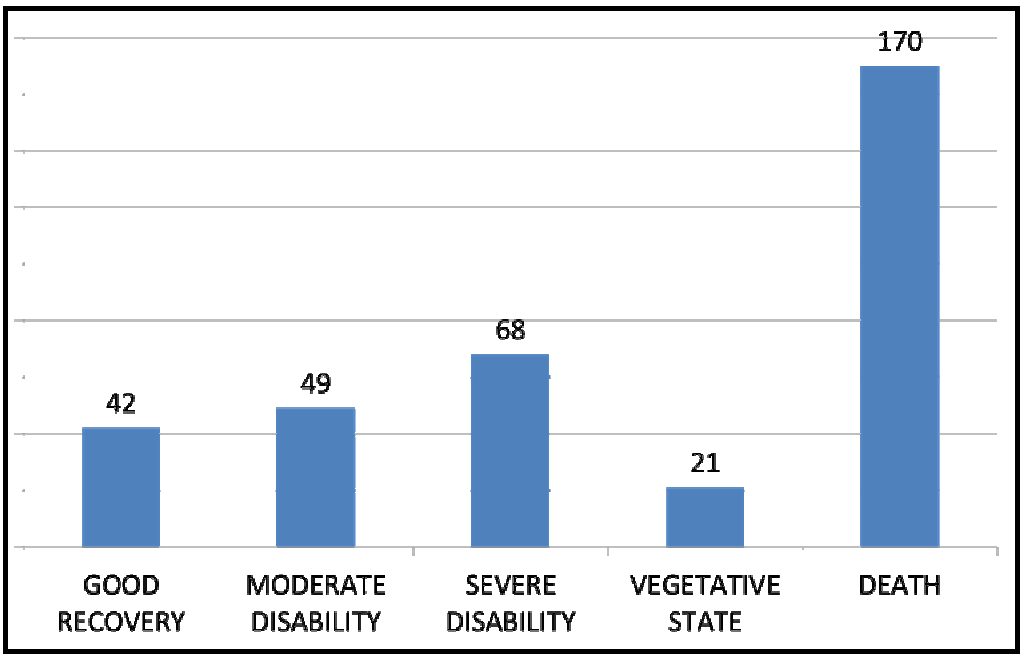


fig 1: The above figure showed comparative analysis of Glasgow outcome scale in 350 Head Injury patients.

AGE GROUP

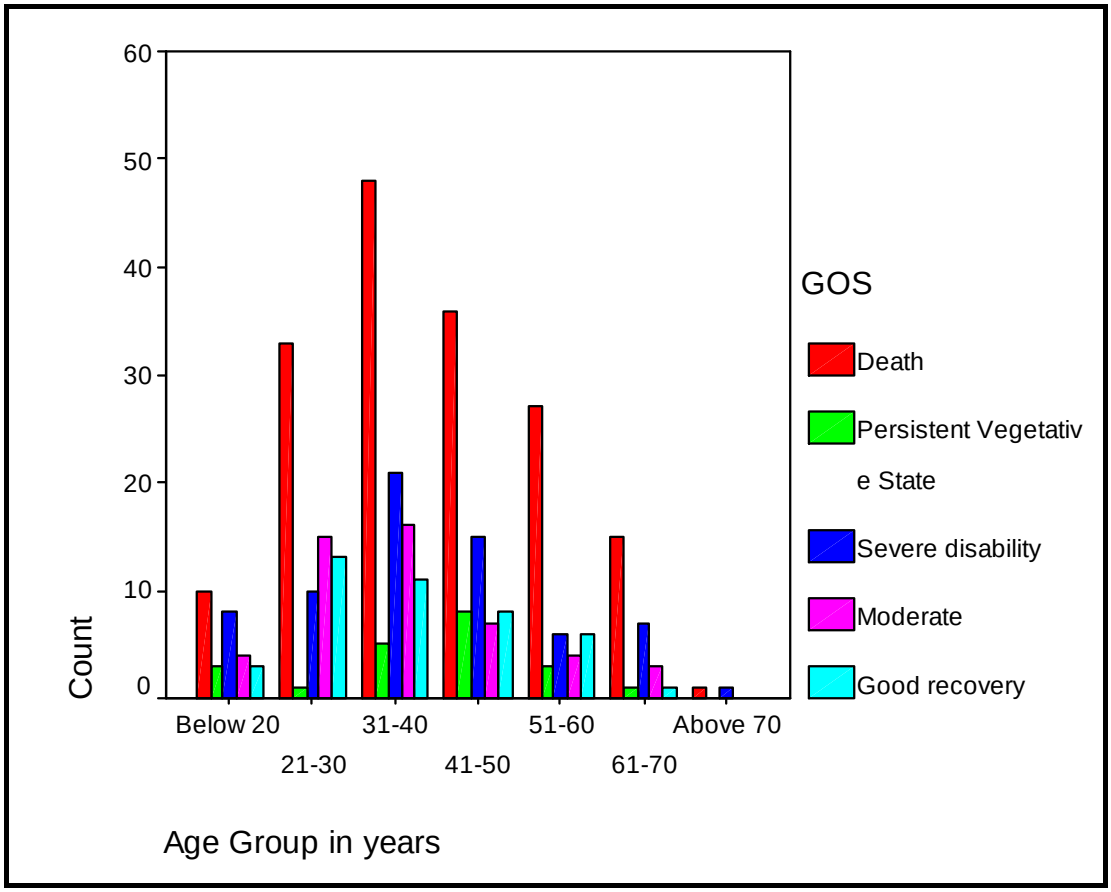
Table 2: Analysis of Age Group vs. GOS

P value=0.480

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Age Group in years	Below 20	Count	10	3	8	4	3	28
		% within Age Group in years	35.7%	10.7%	28.6%	14.3%	10.7%	100.0%
		% within GOS	5.9%	14.3%	11.8%	8.2%	7.1%	8.0%
	21-30	Count	33	1	10	15	13	72
		% within Age Group in years	45.8%	1.4%	13.9%	20.8%	18.1%	100.0%
		% within GOS	19.4%	4.8%	14.7%	30.6%	31.0%	20.6%
	31-40	Count	48	5	21	16	11	101
		% within Age Group in years	47.5%	5.0%	20.8%	15.8%	10.9%	100.0%
		% within GOS	28.2%	23.8%	30.9%	32.7%	26.2%	28.9%
	41-50	Count	36	8	15	7	8	74
		% within Age Group in years	48.6%	10.8%	20.3%	9.5%	10.8%	100.0%
		% within GOS	21.2%	38.1%	22.1%	14.3%	19.0%	21.1%
	51-60	Count	27	3	6	4	6	46
		% within Age Group in years	58.7%	6.5%	13.0%	8.7%	13.0%	100.0%
		% within GOS	15.9%	14.3%	8.8%	8.2%	14.3%	13.1%

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
	61-70	Count	15	1	7	3	1	27
		% within Age Group in years	55.6%	3.7%	25.9%	11.1%	3.7%	100.0%
		% within GOS	8.8%	4.8%	10.3%	6.1%	2.4%	7.7%
	Above 70	Count	1	0	1	0	0	2
		% within Age Group in years	50.0%	.0%	50.0%	.0%	.0%	100.0%
		% within GOS	.6%	.0%	1.5%	.0%	.0%	.6%
Total		Count	170	21	68	49	42	350
		% within Age Group in years	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that majority of the patient were from 3rd decade, 2nd and 4th decade patient comes next, Good recovery was more in 2nd decade patients than 3rd decade.



The above figures showed comparative analysis of various age group with GOS.

Table 2 a: Statistical Analysis of Age Group Vs GOS.

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.679(a)	24	.480
Likelihood Ratio	24.813	24	.416
Linear-by-Linear Association	5.509	1	.019
N of Valid Cases	350		

Analysing age group with outcome, statistically p value was 0.480.

SEX DISTRIBUTIOIN

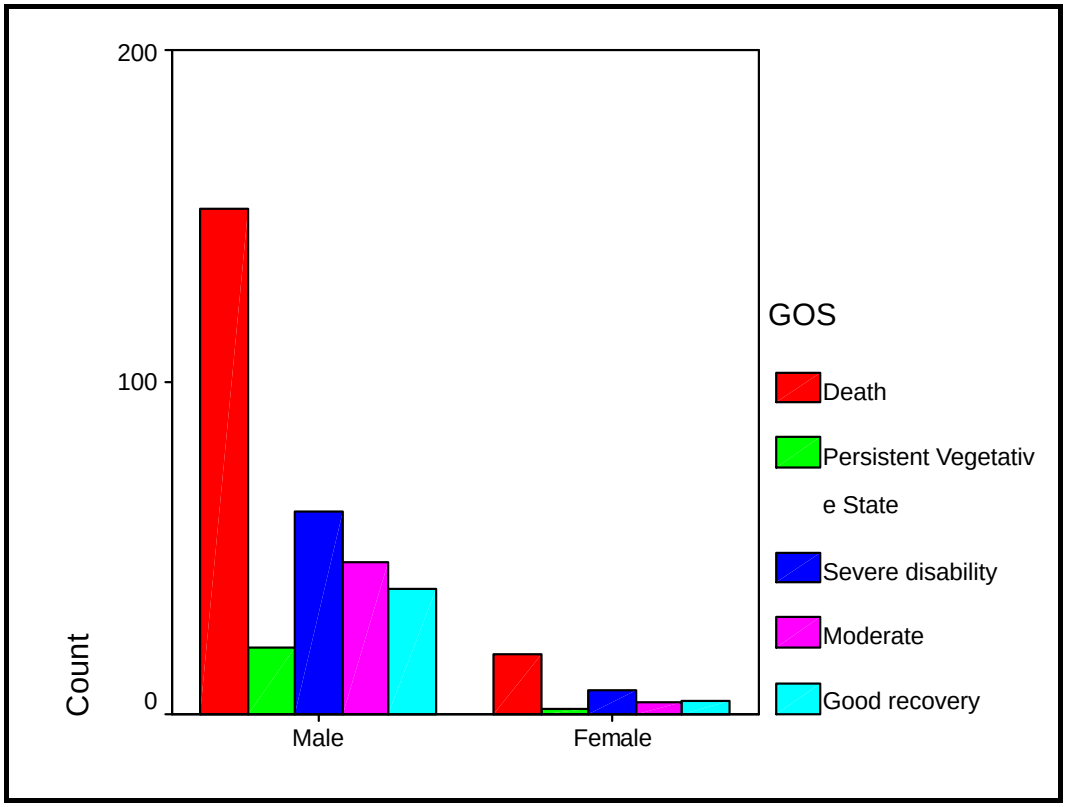
Table 3: Sex distribution Vs GOS

P value=0.828

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
Sex	Male	Count	152	20	61	46	38	317
		% within Sex	47.9%	6.3%	19.2%	14.5%	12.0%	100.0%
		% within GOS	89.4%	95.2%	89.7%	93.9%	90.5%	90.6%
	Female	Count	18	1	7	3	4	33
		% within Sex	54.5%	3.0%	21.2%	9.1%	12.1%	100.0%
		% within GOS	10.6%	4.8%	10.3%	6.1%	9.5%	9.4%
Total		Count	170	21	68	49	42	350
		% within Sex	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients males were 317 patients and females were 33%.

Table 3 compares the sex distribution and outcome.



Sex Distribution

fig 3: The above figure showed the outcome in male and female patients.

Table 3a: Statistical Analysis of Sex Distribution Vs GOS

Chi-Square test	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	1.491(a)	4	.828
Likelihood Ratio	1.668	4	.796
Linear-by-Linear Association	.308	1	.579
N of Valid Cases	350		

Applying the statistical methods the p value for sex distribution was 0.828.

MODE OF INJURY

Table 4: Mode of Injury Vs GOS

P value=<0.001**

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
Mode of injury	MVA	Count	121	18	61	46	26	272
		% within Mode of injury	44.5%	6.6%	22.4%	16.9%	9.6%	100.0%
		% within GOS	71.2%	85.7%	89.7%	93.9%	61.9%	77.7%
	TA	Count	19	2	0	0	5	26
		% within Mode of injury	73.1%	7.7%	.0%	.0%	19.2%	100.0%
-		% within GOS	11.2%	9.5%	.0%	.0%	11.9%	7.4%
	Fall	Count	17	0	3	2	7	29
		% within Mode of injury	58.6%	.0%	10.3%	6.9%	24.1%	100.0%
		% within GOS	10.0%	.0%	4.4%	4.1%	16.7%	8.3%
	Assault	Count	13	1	4	1	4	23
		% within Mode of injury	56.5%	4.3%	17.4%	4.3%	17.4%	100.0%
		% within GOS	7.6%	4.8%	5.9%	2.0%	9.5%	6.6%
Total		Count	170	21	68	49	42	350
		% within Mode of injury	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

272 patients in the study group sustained MVA. While 26 patients had train accident, 29 patients were with the history of fall, while 23 patients were assaulted.

The result showed that 44% of MVA patients died, 80% of train accident patients died. Patient with assault and fall had almost equal number of deaths and survival.

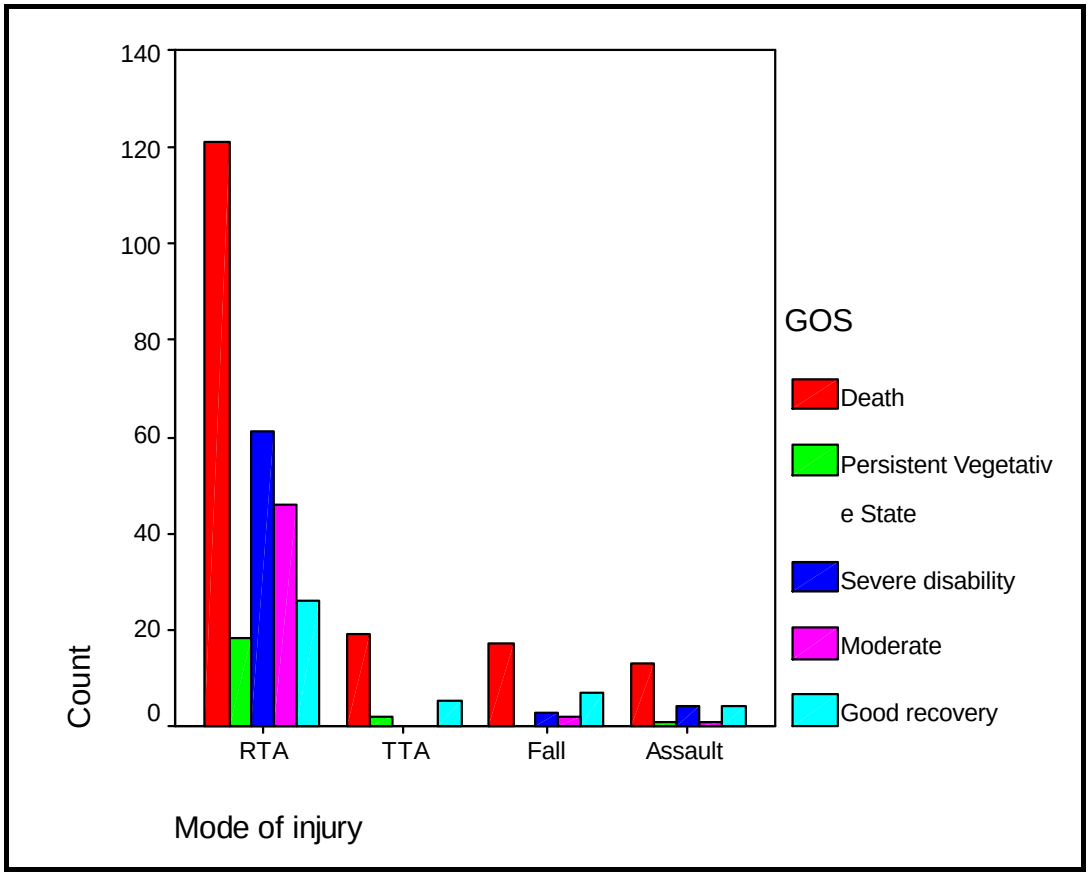


Fig 5: The above figure showed various mode of injury and its outcome in severe head injury patients.

Table 4 a: Statistical Analysis of Mode of Injury Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.248(a)	12	.004
Likelihood Ratio	39.162	12	.000
Linear-by-Linear Association	.665	1	.415
N of Valid Cases	350		

TIME INTERVAL

Table 5: Analysis of Time Interval Vs GOS

P value=<0.001**

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Time interval in hours	Below 2	Count	17	0	1	5	28	51
		% within Time interval in hours	33.3%	.0%	2.0%	9.8%	54.9%	100.0%
		% within GOS	10.0%	.0%	1.5%	10.2%	66.7%	14.6%
	2-4	Count	32	5	10	23	10	80
		% within Time interval in hours	40.0%	6.3%	12.5%	28.8%	12.5%	100.0%
		% within GOS	18.8%	23.8%	14.7%	46.9%	23.8%	22.9%
	4-8	Count	84	14	47	21	4	170
		% within Time interval in hours	49.4%	8.2%	27.6%	12.4%	2.4%	100.0%
		% within GOS	49.4%	66.7%	69.1%	42.9%	9.5%	48.6%
	8-12	Count	30	1	10	0	0	41
		% within Time interval zin hours	73.2%	2.4%	24.4%	.0%	.0%	100.0%
		% within GOS	17.6%	4.8%	14.7%	.0%	.0%	11.7%
	12-24	Count	6	1	0	0	0	7
		% within Time interval in hours	85.7%	14.3%	.0%	.0%	.0%	100.0%
		% within GOS	3.5%	4.8%	.0%	.0%	.0%	2.0%

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
	Above 24	Count	1	0	0	0	0	1
		% within Time interval in hours	100.0%	.0%	.0%	.0%	.0%	100.0%
		% within GOS	.6%	.0%	.0%	.0%	.0%	.3%
Total		Count	170	21	68	49	42	350
		% within Time interval in hours	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Observing the time interval between the accident and start of treatment, this study showed that patient reporting with in 2 hours of trauma had a good outcome. Only 33% death occurred. The death percentage increases as the time interval of arrival increases.

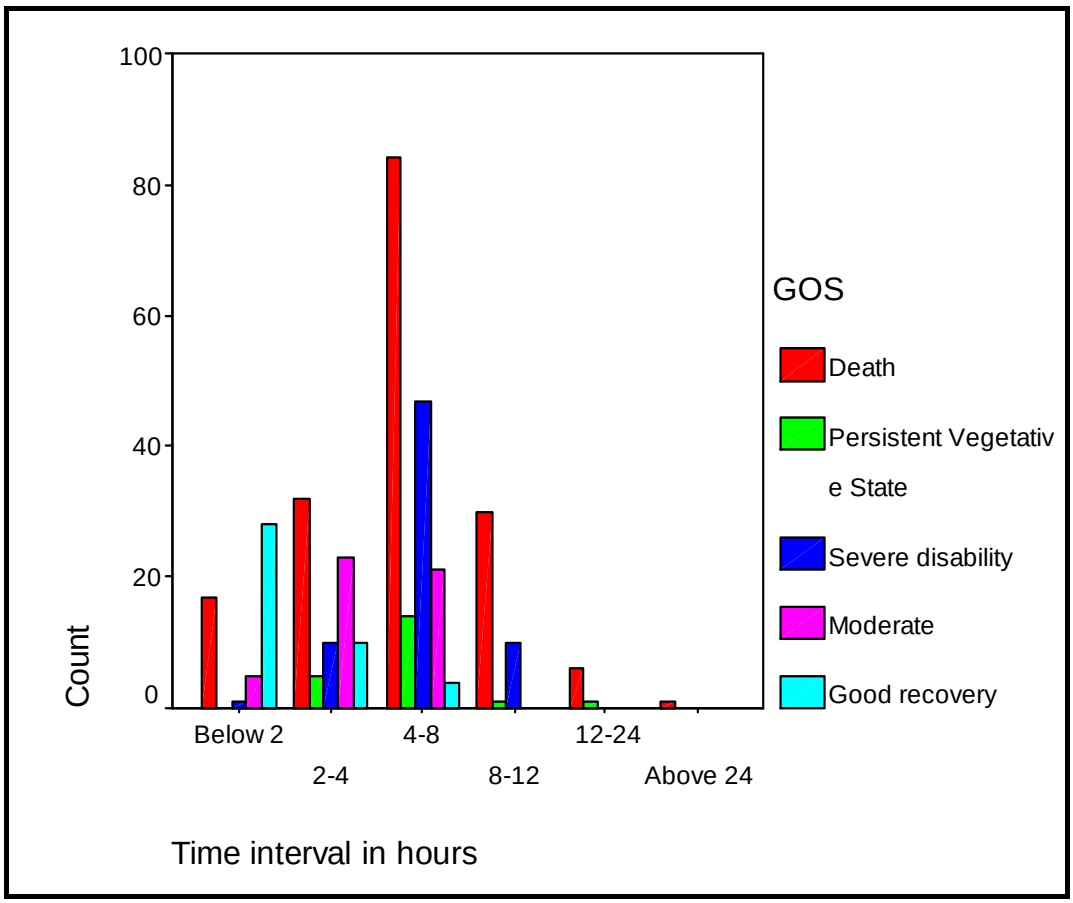


fig 6: The above figure showed the various time interval compared with outcome of severe head injury patients.

Table 5 a: Statistical Analysis of Time Interval Vs GOS

Chi-Square Tests	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	153.064(a)	20	.000
Likelihood Ratio	141.233	20	.000
Linear-by-Linear Association	58.057	1	.000
N of Valid Cases	350		

Applying the statistical method the p value for time interval was significant (p=<0.001**)

GCS

Table 6: Analysis of GCS Vs GOS

P value=<0.001**

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
GCS	3	Count	65	0	0	0	0	65
		% within GCS	100.0%	.0%	.0%	.0%	.0%	100.0%
		% within GOS	38.2%	.0%	.0%	.0%	.0%	18.6%
	4	Count	53	9	2	0	0	64
		% within GCS	82.8%	14.1%	3.1%	.0%	.0%	100.0%
		% within GOS	31.2%	42.9%	2.9%	.0%	.0%	18.3%
	5	Count	18	4	22	8	4	56
		% within GCS	32.1%	7.1%	39.3%	14.3%	7.1%	100.0%
		% within GOS	10.6%	19.0%	32.4%	16.3%	9.5%	16.0%
	6	Count	20	4	20	22	5	71
		% within GCS	28.2%	5.6%	28.2%	31.0%	7.0%	100.0%
		% within GOS	11.8%	19.0%	29.4%	44.9%	11.9%	20.3%
	7	Count	7	2	15	8	6	38

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
		% within GCS	18.4%	5.3%	39.5%	21.1%	15.8%	100.0%
		% within GOS	4.1%	9.5%	22.1%	16.3%	14.3%	10.9%
	8	Count	7	2	9	11	27	56
		% within GCS	12.5%	3.6%	16.1%	19.6%	48.2%	100.0%
		% within GOS	4.1%	9.5%	13.2%	22.4%	64.3%	16.0%
Total		Count	170	21	68	49	42	350
		% within GCS	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that 65 patients GCS 3 on admission died followed by GCS 4, 5 and 6. GCS 7 and 8 patients could survive the trauma.

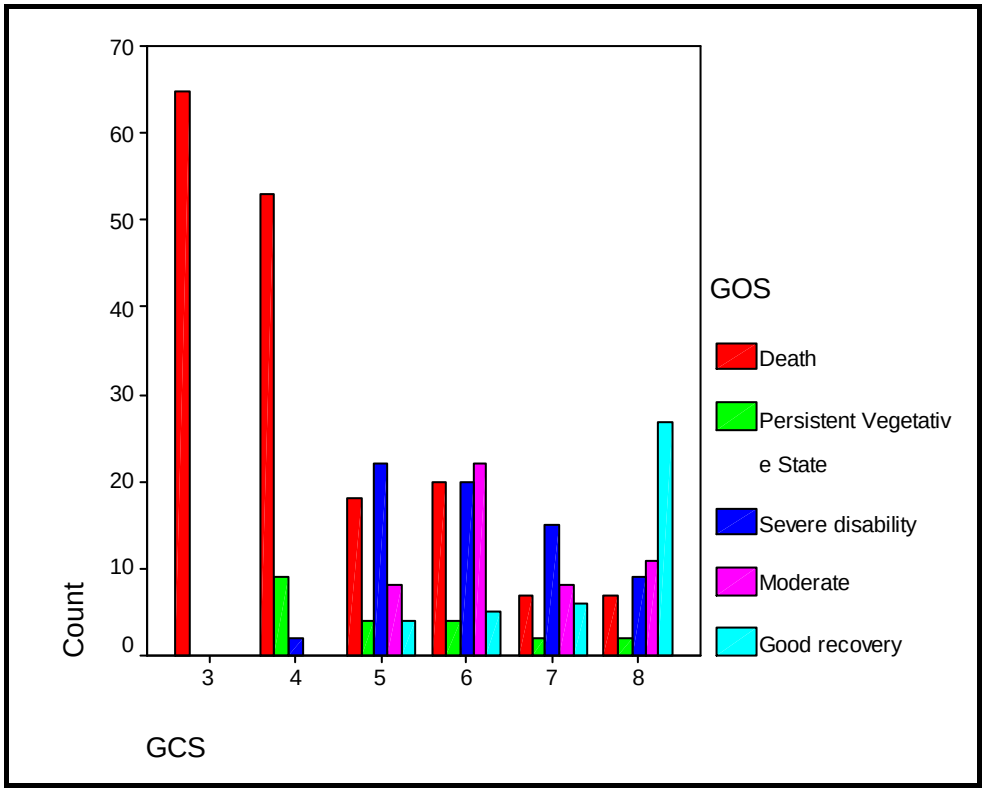


fig 7: The above figure comparing the GCS score on admission with outcome.

Table 6 a: Statistical Analysis of GCS Vs GOS

Chi-Square Tests	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	252.447(a)	20	.000
Likelihood Ratio	269.380	20	.000
Linear-by-Linear Association	160.088	1	.000
N of Valid Cases	350		

Applying the statistical method the p value for GCS score on admission was significant (p=<0.001**)

PUPILLARY SIZE

Table 7: Analysis of Pupillary Size - GOS

P value=<0.001**

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Pupils - Sym	Positive	Count	97	19	66	49	42	273
		% within Pupils - Sym	35.5%	7.0%	24.2%	17.9%	15.4%	100.0%
		% within GOS	57.1%	90.5%	97.1%	100.0%	100.0%	78.0%
	Negative	Count	73	2	2	0	0	77
		% within Pupils - Sym	94.8%	2.6%	2.6%	.0%	.0%	100.0%
		% within GOS	42.9%	9.5%	2.9%	.0%	.0%	22.0%
Total		Count	170	21	68	49	42	350
		% within Pupils - Sym	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that majority of the patient were having symmetric pupils but patients with asymmetric pupils (anisocoria) had a poor outcome. No good recovery patients in Asymmetric pupils.

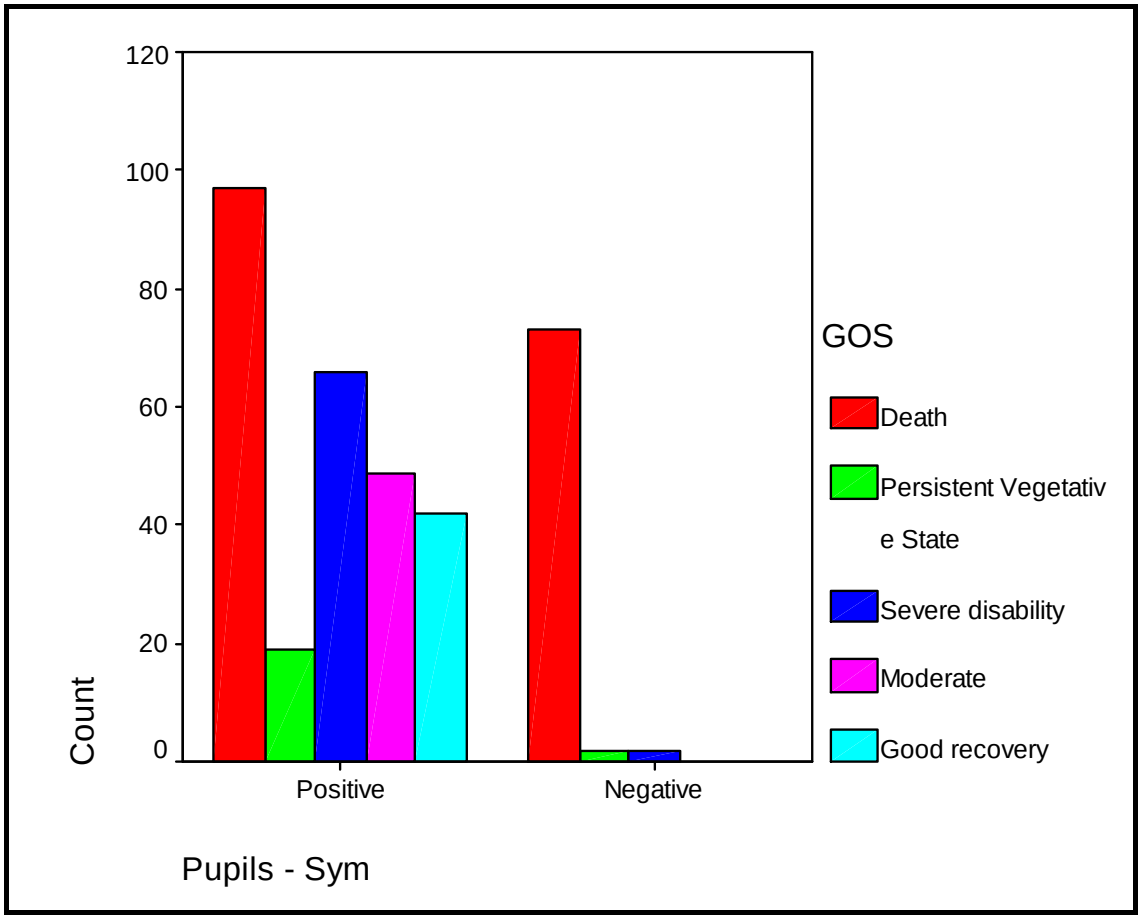


Fig 8: The above figure showed that comparative analysis of pupillary size with outcome of severe head injury patients.

Table 7 a: Statistical Analysis of Pupillary Size Vs GOS

Chi-Square Test	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	85.410(a)	4	.000
Likelihood Ratio	105.310	4	.000
Linear-by-Linear Association	72.290	1	.000
N of Valid Cases	350		

Applying the Chi-square tests the 'p' value is <0.001 for pupillary size assessment. statistical methods showed the p value for time interval was significant (p=<0.001**)

PUPILLARY LIGHT REACTION

Table 8: Analysis of Pupillary Light Reaction Vs GOS

P value=<0.001**

			GOS					**Total**
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Pupils - RL	Positive	Count	8	1	35	49	39	132
		% within Pupils - RL	6.1%	.8%	26.5%	37.1%	29.5%	100.0%
		% within GOS	4.7%	4.8%	51.5%	100.0%	92.9%	37.7%
	Negative	Count	162	20	33	0	3	218
		% within Pupils - RL	74.3%	9.2%	15.1%	.0%	1.4%	100.0%
		% within GOS	95.3%	95.2%	48.5%	.0%	7.1%	62.3%

		GOS					Total
		Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
Total	Count	170	21	68	49	42	350
	% within Pupils - RL	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
	% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed reaction to light plays a very important role and only 3 patients had good recovery in non-reactive pupils category, whereas 39 patients had good recovery in reactive pupils. 8 people with reacting pupil died while 162 people with non reactive people died.

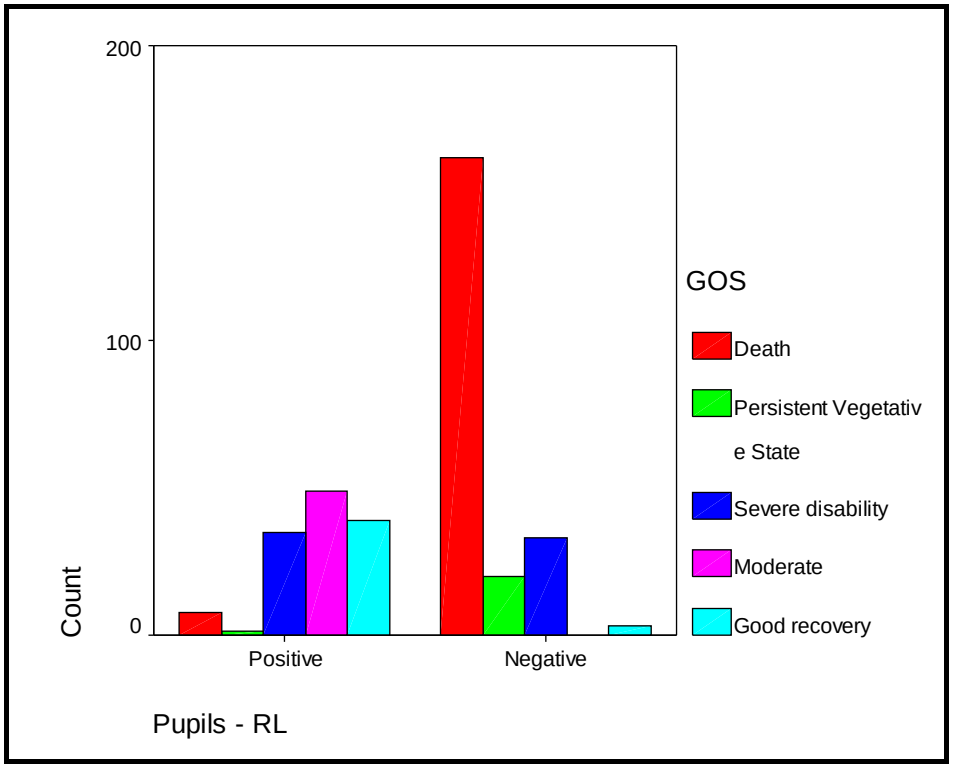


Fig 9: The above figure comparing the pupillary light reaction of severe head injury patients with their outcome.

Table 8 a: Statistical Analysis of Pupillary light Reaction Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	229.327(a)	4	.000
Likelihood Ratio	275.470	4	.000
Linear-by-Linear Association	211.900	1	.000
N of Valid Cases	350		

Applying the Chi-square test the p value is < 0.001 for pupillary light reactions.

DEM (DOLL'S EYE MOVEMENT)

Table 9: Analysis of DEM Vs GOS

P value=<0.001**

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
DEM	Present	Count	24	0	31	43	40	138
		% within DEM	17.4%	.0%	22.5%	31.2%	29.0%	100.0%
		% within GOS	14.1%	.0%	45.6%	87.8%	95.2%	39.4%
	Absent	Count	57	0	0	0	0	57
		% within DEM	100.0%	.0%	.0%	.0%	.0%	100.0%
		% within GOS	33.5%	.0%	.0%	.0%	.0%	16.3%
	Imp	Count	89	21	37	6	2	155
		% within DEM	57.4%	13.5%	23.9%	3.9%	1.3%	100.0%
		% within GOS	52.4%	100.0%	54.4%	12.2%	4.8%	44.3%

		GOS					Total
		Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
Total	Count	170	21	68	49	42	350
	% within DEM	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
	% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that absent DEM patients were all dead, In impaired DEM category death is more, good recovery is very less.

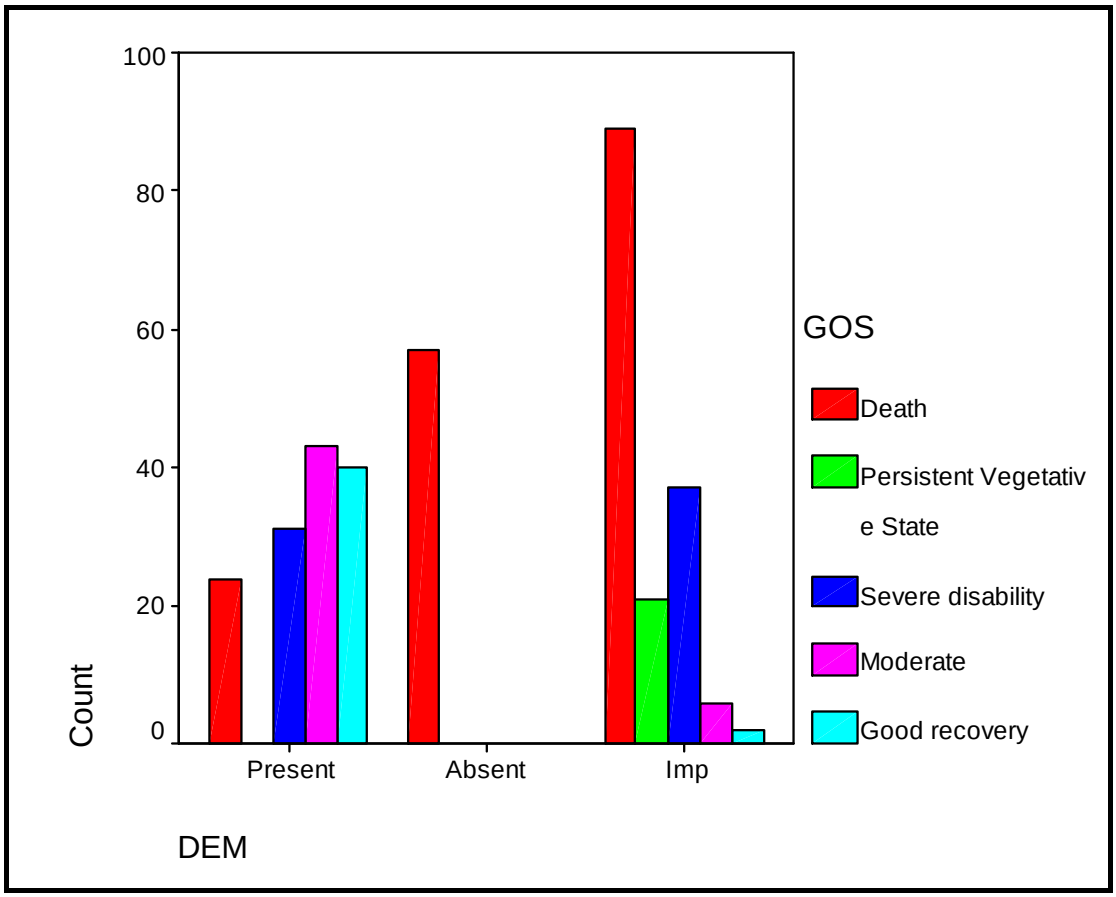


Fig 10: The above figure comparing the DEM of severe head injury patients with their outcome.

Table 9 a: Statistical Analysis of DEM Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	204.078(a)	8	.000
Likelihood Ratio	236.269	8	.000
Linear-by-Linear Association	99.306	1	.000
N of Valid Cases	350		

Applying the Chi-square test the p value for a DEM is significant (p=0.001)

MOTOR RESPONSE

Table 10: Analaysis of Motor Response Vs GOS

P value=<0.001**

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
Motor response	1	Count	65	0	0	0	0	65
		% within Motor response	100.0%	.0%	.0%	.0%	.0%	100.0%
		% within GOS	38.2%	.0%	.0%	.0%	.0%	18.6%
	2	Count	53	9	2	0	0	64
		% within Motor response	82.8%	14.1%	3.1%	.0%	.0%	100.0%
		% within GOS	31.2%	42.9%	2.9%	.0%	.0%	18.3%

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
	3	Count	18	4	22	8	4	56
		% within Motor response	32.1%	7.1%	39.3%	14.3%	7.1%	100.0%
		% within GOS	10.6%	19.0%	32.4%	16.3%	9.5%	16.0%
	4	Count	20	4	20	22	5	71
		% within Motor response	28.2%	5.6%	28.2%	31.0%	7.0%	100.0%
		% within GOS	11.8%	19.0%	29.4%	44.9%	11.9%	20.3%
	5	Count	14	4	24	19	33	94
		% within Motor response	14.9%	4.3%	25.5%	20.2%	35.1%	100.0%
		% within GOS	8.2%	19.0%	35.3%	38.8%	78.6%	26.9%
Total		Count	170	21	68	49	42	350
		% within Motor response	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In GCS score motor response is very good predictor of outcome than eye opening and verbal response. Analysis of GOS with motor response of GCS showed 65 patients with M1 died. 53 patients of 64 patients with M2 died. Patients with M3 had severe disability while 18 of them died. Out of 7 patients with a motor response score of 4, 20 patients died. 94 patients with M5 could survive better with the death of 14 Patients.

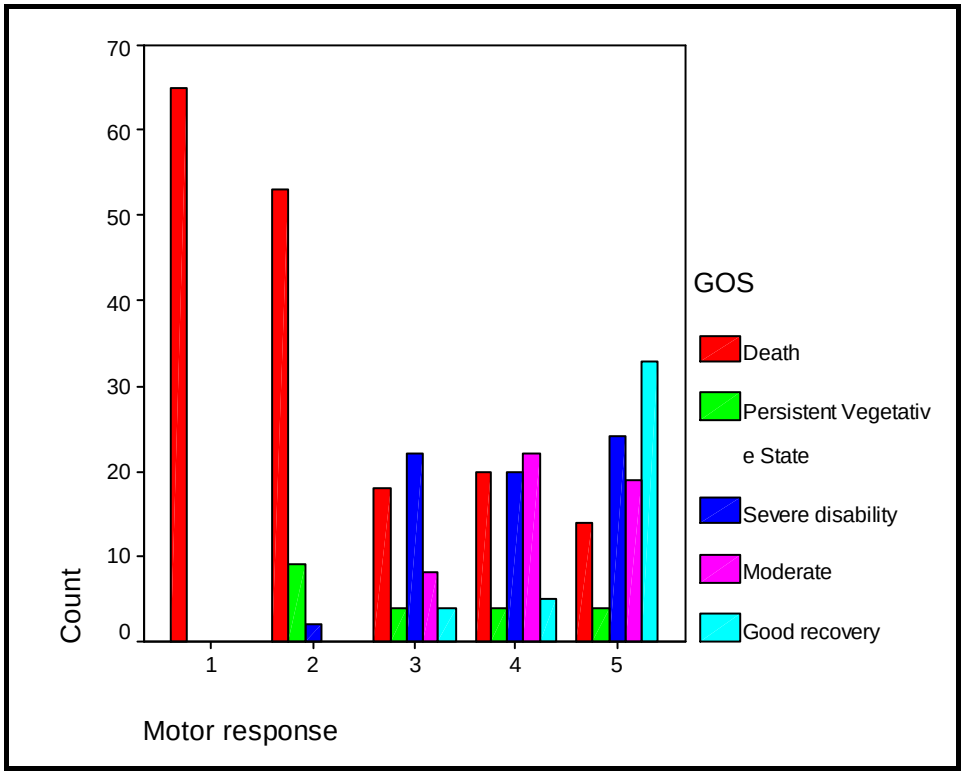


Fig 11: The above figure showed the comparision of motor response of severe head injury patients with their outcome.

Table 10 a: Statistical Analysis of Motor Response Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	225.927(a)	16	.000
Likelihood Ratio	256.402	16	.000
Linear-by-Linear Association	156.263	1	.000
N of Valid Cases	350		

Applying the Chi-square analysis this study data had a p value of p=<0.001. Among the 3 parameters of GCS, motor response assessment was a Good predictor of outcome.

CT FINDINGS

All patients underwent CT scan brain and findings are tabulated as per Table 11.

Table 11 a: CT Findings

Contusions	126	36%
a. Brainstem	37	1O.6%
b. Others (Frontal, Parietal, temporal, occipital, unilateral and Bilateral)	89	25.4%
SDH	122	34.9%
DAI	37	10.6%
EDH	27	7.8%
SAH	35	10%
ICH	3	0.9%

Predominant parenchymal injuries were contusions and sub dural haemotomas (SDH), 126 (36%) and 122 (34.9%) respectively. Other CT findings were almost equally in numbers except CT findings of ICH.

Table 11 B: CT Findings – Contusions

Contusion	126	36%
Brainstem	37	10.6%
Others	89	25.4%

CT findings of severe head injury patients parenchymal contusions were the predominant findings. (126 patients)

Table 11 C:Analysis of CT Findings- Brainstem Contusions Vs GOS

Treatment	**Total**	**%**	**GOS**				
			5	**4**	**3**	**2**	**1**
Conservative	37	10.5	4	1	2	12	18

Among the primary brain stem contusion patients all the 37 patients were with GCS of 3 or 4 and analyzing the GOS score, 4 patients had good recovery among the 37 patients. 18 patients died while 12 patients had a GOS score of 2.

Table 11 D:Analysis of CT Findings-Other Contusions Vs GOS

Treatment	Total	%	GOS				
			5	4	3	2	1
Operated	58	16.6	7	6	15	1	29
Conservative	31	18.9	0	0	0	1	30

In remaining 89 patients of parenchymal contusions (Frontal, Parietal, Temporal, Occipital, Multiple Unilateral and Multiple Bilateral). 58 patients were operated and 31 patients treated conservatively. 7 patients who were operated had good recovery and 15 patients were having severe disability. But in conservatively treated patients one patient recovered with vegetative state, but 30 patients died.

Table 11 E: Analysis of CT Findings-SDH Vs GOS

Treatment	Total	%	GOS				
			5	4	3	2	1
Operated	114	32.6	13	23	39	1	38
Conservative	8	0	0	0	0	0	8

122 patients had SDH, 114 patients were underwent surgery and 8 patients treated conservatively. All 8 patients conservatively treated were died. Among the operated, 38 patients died while 39 patients had an outcome score of 3. 13 patients were having good recovery and 23 patients had moderate disability.

Table 11 F: Analysis of CT Findings-DAI Vs GOS

Treatment	Total	%	GOS				
			5	4	3	2	1
Conservative	37	12	8	7	1	1	20

Among the 37 DAI patients whose CT Brain where normal with admission GCS of 4 and 5, all patients were treated conservatively, 8 patients had good recovery and 20 patients died.

Table 11 G:Analysis of CT Findings-EDH Vs GOS

Treatment	Total	%	GOS				
			5	4	3	2	1
Operated	27	7.7	10	9	1	0	7
Conservative	0	0	0	0	0	0	0

In this study 27 patients had EDH and all of them underwent surgery, 10 patients who had good recovery, (8 patients with GCS 8 and 2 patients with GCS 7),while 9 patients had an outcome score of 4 (moderate disability).

Table 11 H: Analysis of CT Findings-tSAH Vs GOS

Treatment	Total	%	GOS				
			5	4	3	2	1
Conservative	35	9.99	0	3	8	4	20

In this study 35 patients were having tSAH, treated conservatively. Due to their poor admission GCS (3 and 4), they had a poor outcome (20 Patients were dead among 35). Maximum recovery of 3 patients with outcome score of 4.

Table 11 I:Analysis of CT Findings-ICH Vs GOS

Treatment	Total	%	GOS				
			5	4	3	2	1
Operated	0	0	0	0	0	0	0
Conservative	3	0.9	0	0	0	0	3

Only 3 patients in their CT finding had ICH (Ganglio capsular), of these, 2 patients with GCS 3 and 1patient with GCS 8 did not survive and died.

ASSOCIATED INJURIES

Table 12: Analysis of Other associated Injuries - GOS

P value=<0.001**

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Other ass injuries	Yes	Count	58	4	12	0	5	79
		% within Other ass injuries	73.4%	5.1%	15.2%	.0%	6.3%	100.0%
		% within GOS	34.1%	19.0%	17.6%	.0%	11.9%	22.6%
	No	Count	112	17	56	49	37	271
		% within Other ass injuries	41.3%	6.3%	20.7%	18.1%	13.7%	100.0%
		% within GOS	65.9%	81.0%	82.4%	100.0%	88.1%	77.4%
Total		Count	170	21	68	49	42	350
		% within Other ass injuries	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that death is maximum seen if head injury is associated with other injuries. Polytrauma patient with other injury have poor outcome than isoloated head injuries.

The following injuries were associated in the 79 severe head injury patients.

Chest Injury	3	0.9%
Abdomen	10	2.9%
ABD + Chest	23	6.6%
Bone	34	10%
Bone + ABD	5	1.42%
Bone + Chest	3	0.9%
Bone + Chest + ABD	1	0.3%

Of those 79 patients, 5 patients had good recovery, 58 patients were died.

Those 5 patients were having only bony injuries and not other major injuries like chest and abdominal injuries.

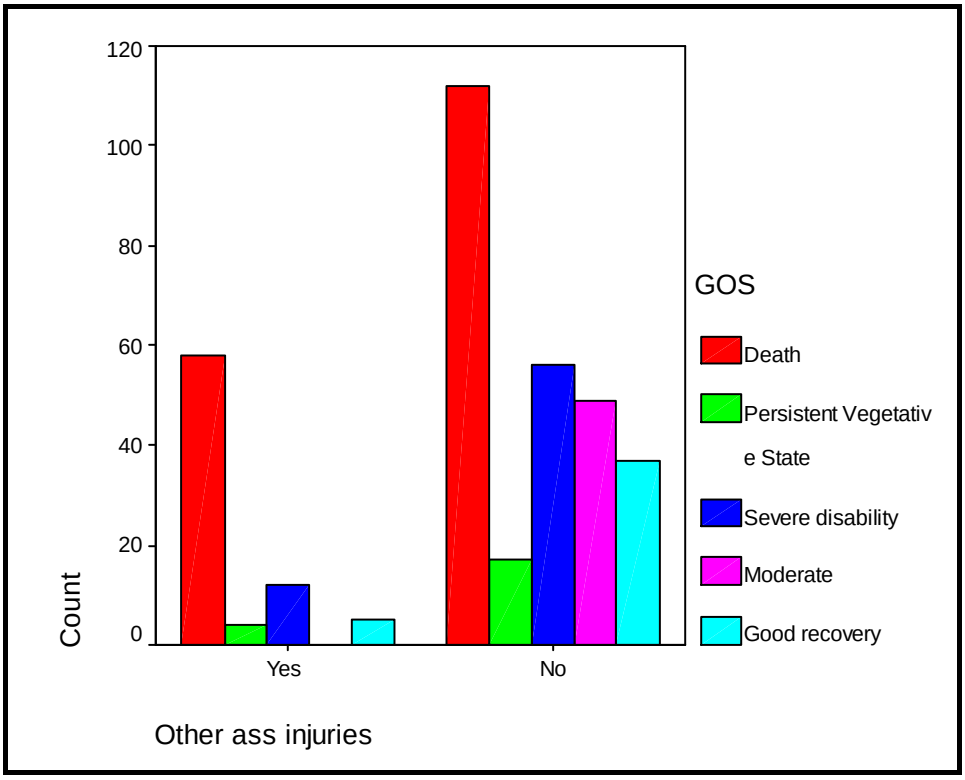


fig 12: The above figure showed the comparison between outcome of severe head injury patients and their associated injuries.

Table 12 a: Statistical Analysis of Other Associated Injuries Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.079(a)	4	.000
Likelihood Ratio	41.128	4	.000
Linear-by-Linear Association	25.408	1	.000
N of Valid Cases	350		

Applying Chi-Square analysis this study data had a p value of p=<0.001.

Hb STATUS

Table 13: Analysis of Hb status Vs GOS

P value=<0.001**

			GOS					
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	Total
Hb status	NA	Count	112	17	57	49	37	272
		% within Hb status	41.2%	6.3%	21.0%	18.0%	13.6%	100.0%
		% within GOS	65.9%	81.0%	83.8%	100.0%	88.1%	77.7%
	No	Count	58	4	11	0	5	78
		% within Hb status	74.4%	5.1%	14.1%	.0%	6.4%	100.0%
		% within GOS	34.1%	19.0%	16.2%	.0%	11.9%	22.3%
Total		Count	170	21	68	49	42	350
		% within Hb status	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that anemia plays important role, as it causes more death when present with severe head injury patients. Good recovery patients had normal hemoglobin status.

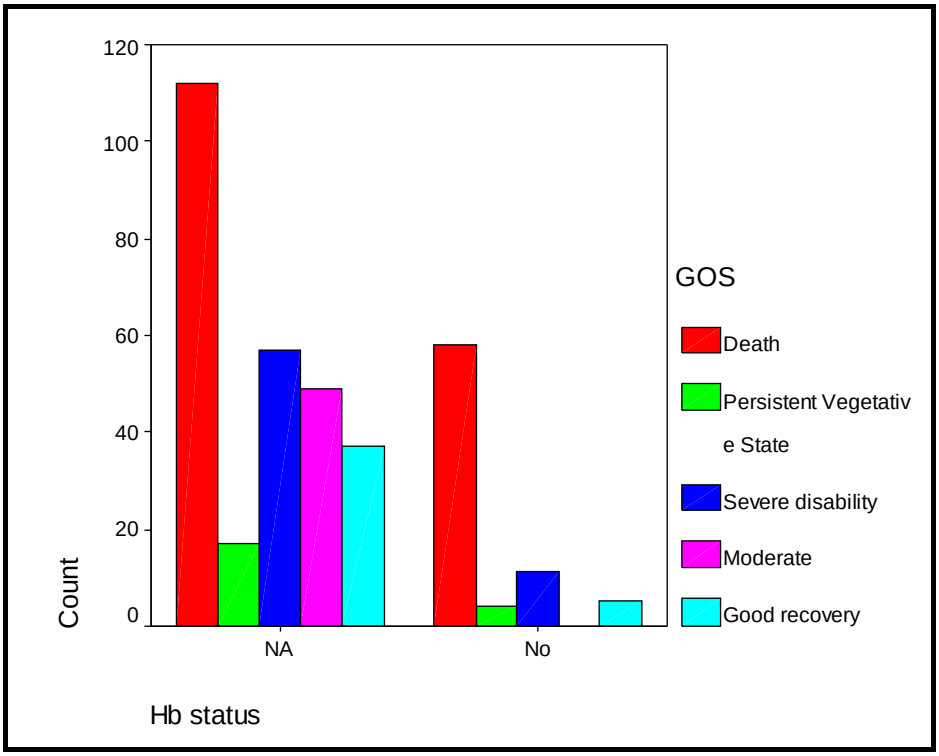


fig 13: The above figure showed the comparison of outcome of severe head injury patients with their hemoglobin status.

Table 13 a: Statistical Analysis of Hb Status Vs GOS

Chi-Square Tests	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	31.999(a)	4	.000
Likelihood Ratio	41.830	4	.000
Linear-by-Linear Association	26.213	1	.000
N of Valid Cases	350		

Applying the Chi-Square tests p value for hemoglobin status was p=<0.001.

CO-MORBIDITIES

Table 14: Co-morbidities Vs GOS

P value=<0.001**

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Co morbidities (Diabetes, Hypertension Asthma)	Yes	Count	31	1	4	0	3	39
		% within Co morbities	79.5%	2.6%	10.3%	.0%	7.7%	100.0%
		% within GOS	18.2%	4.8%	5.9%	.0%	7.1%	11.1%
	No	Count	139	20	64	49	39	311
		% within Co morbities	44.7%	6.4%	20.6%	15.8%	12.5%	100.0%
		% within GOS	81.8%	95.2%	94.1%	100.0%	92.9%	88.9%
Total		Count	170	21	68	49	42	350
		% within Co morbities	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that co-morbid conditions if they associated with severe head injury will cause more deaths when compare to normal patients.

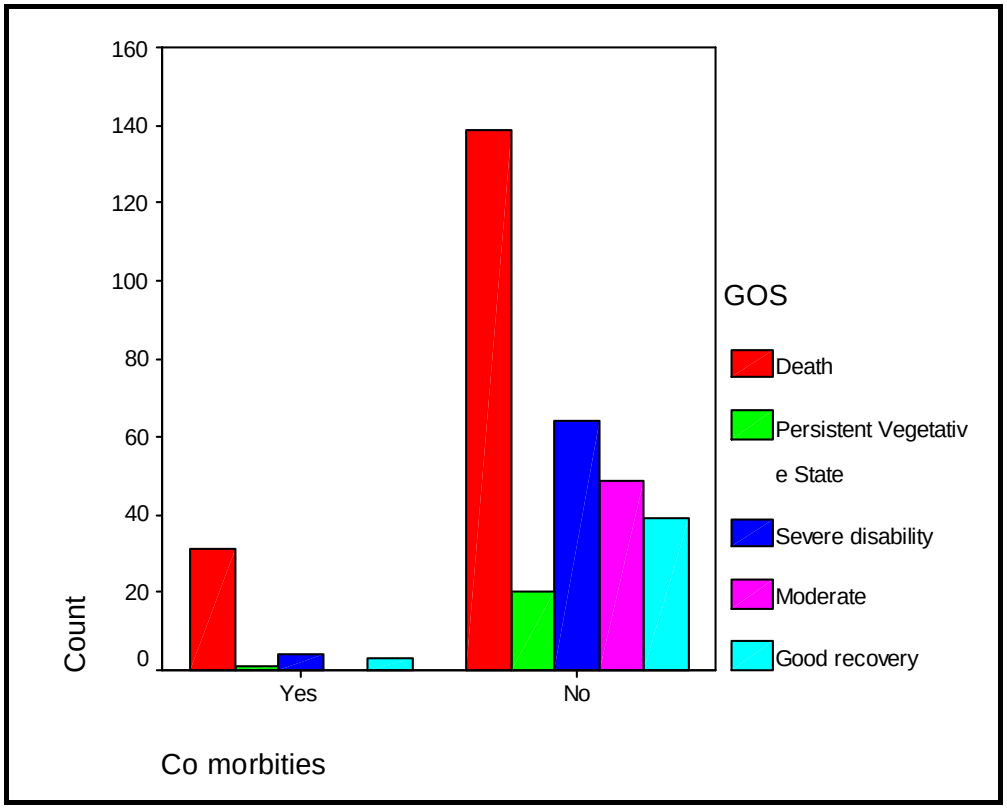


Fig 14: The above table showed the comparison of outcome in severe head injury patients with their co-morbidities.

Table 14 a: Statistical Analysis of Co-Morbidities Vs GOS

Chi-Square Tests	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	18.224(a)	4	.001
Likelihood Ratio	23.083	4	.000
Linear-by-Linear Association	13.064	1	.000
N of Valid Cases	350		

Applying Chi-Square statistical analysis the p value for co-morbidity was p=<0.001.

COAGULATION PROFILE

Table 15: Analysis of Coagulation Profile Vs GOS

P value=<0.001**

			GOS					Total
			Death	Persistent Vegetative State	Severe disability	Moderate	Good recovery	
Coag profile	Normal	Count	139	21	67	49	41	317
		% within Coag profile	43.8%	6.6%	21.1%	15.5%	12.9%	100.0%
		% within GOS	81.8%	100.0%	98.5%	100.0%	97.6%	90.6%
	Abnormal	Count	31	0	1	0	1	33
		% within Coag profile	93.9%	.0%	3.0%	.0%	3.0%	100.0%
		% within GOS	18.2%	.0%	1.5%	.0%	2.4%	9.4%
Total		Count	170	21	68	49	42	350
		% within Coag profile	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that coagulation disturbances directly proportionate to increased no. of deaths. Among the few altered coagulopathy patienst majority (> 93.9%) were died. Only 7 patient were having good recovery.

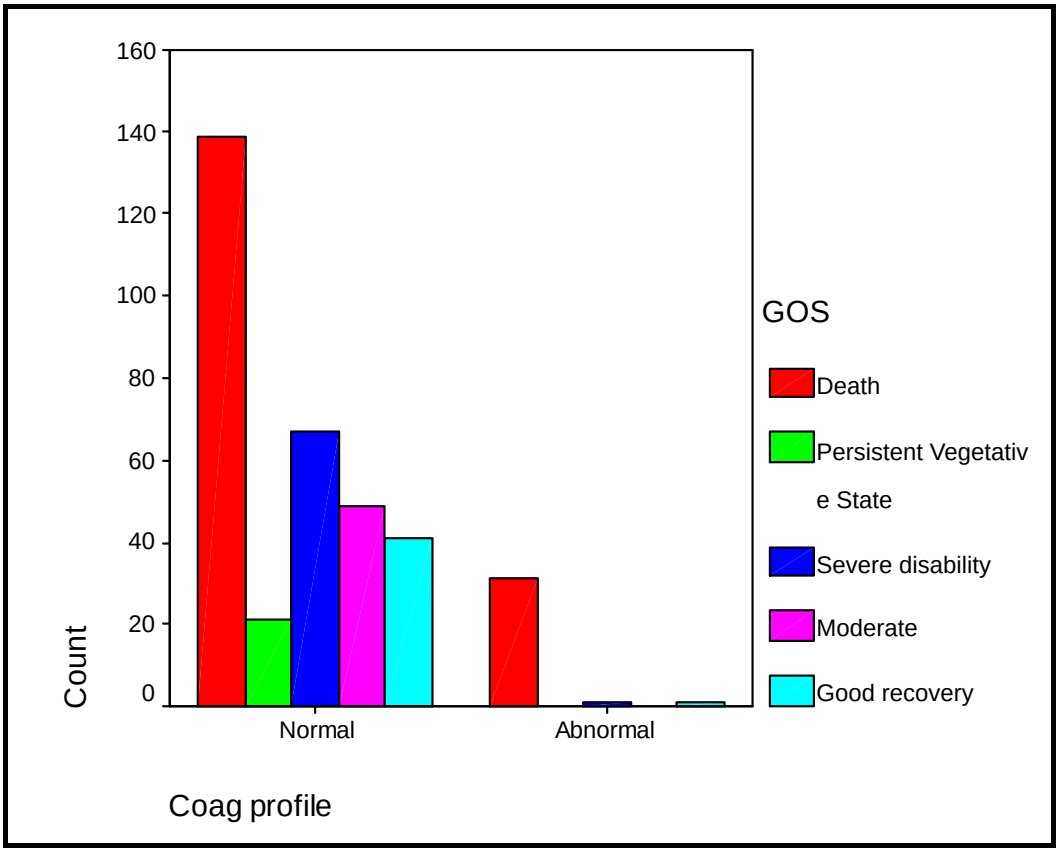


Fig 15: The above figure showed comparison of outcome in severe head injury patients with their Coagulation profile.

Table 15 a: Statistical Analysis of Coagulation Profile Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.213(a)	4	.000
Likelihood Ratio	37.284	4	.000
Linear-by-Linear Association	22.496	1	.000
N of Valid Cases	350		

Applying the Chi-Square test the p value for coagulation profile was p=<0.001.

MANAGEMENT

Table 16: Analysis of Management Vs GOS

P value=<0.001**

			GOS					Total
			Death	**Persistent Vegetative State**	**Severe disability**	**Moderate**	**Good recovery**	
Manage-ment	Conser-vative	Count	96	18	14	11	12	151
		% within Management	63.6%	11.9%	9.3%	7.3%	7.9%	100.0%
		% within GOS	56.5%	85.7%	20.6%	22.4%	28.6%	43.1%
	Operated	Count	74	3	54	38	30	199
		% within Management	37.2%	1.5%	27.1%	19.1%	15.1%	100.0%
		% within GOS	43.5%	14.3%	79.4%	77.6%	71.4%	56.9%
Total		Count	170	21	68	49	42	350
		% within Management	48.6%	6.0%	19.4%	14.0%	12.0%	100.0%
		% within GOS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

In this study of 350 patients the above table showed that in overall 350 patient with severe head injury majority were treated by surgical management (56.9%) compare to conservative management (43.1%). Also good recovery patient were more in surgical treated. Deaths were more seen in conservatively treated patients.

MANAGEMENT

In this study of 350 severe head injury patients majority of the sever head Injury patients were treated with surgical management.

199- patients were treated surgically (56.85%),

151- patients were treated conservatively (43.14%)

But, Patient with good recovery were maximum seen in surgically treated patients – 30 Patients (71.4%)

Death was maximum in those patientsw treated conservatively.

Morethan 50% of the study population underwent surgical management were as 30 patients had good recovery, deaths were more in conservatively managed patients and survived patients had poor outcome scores.

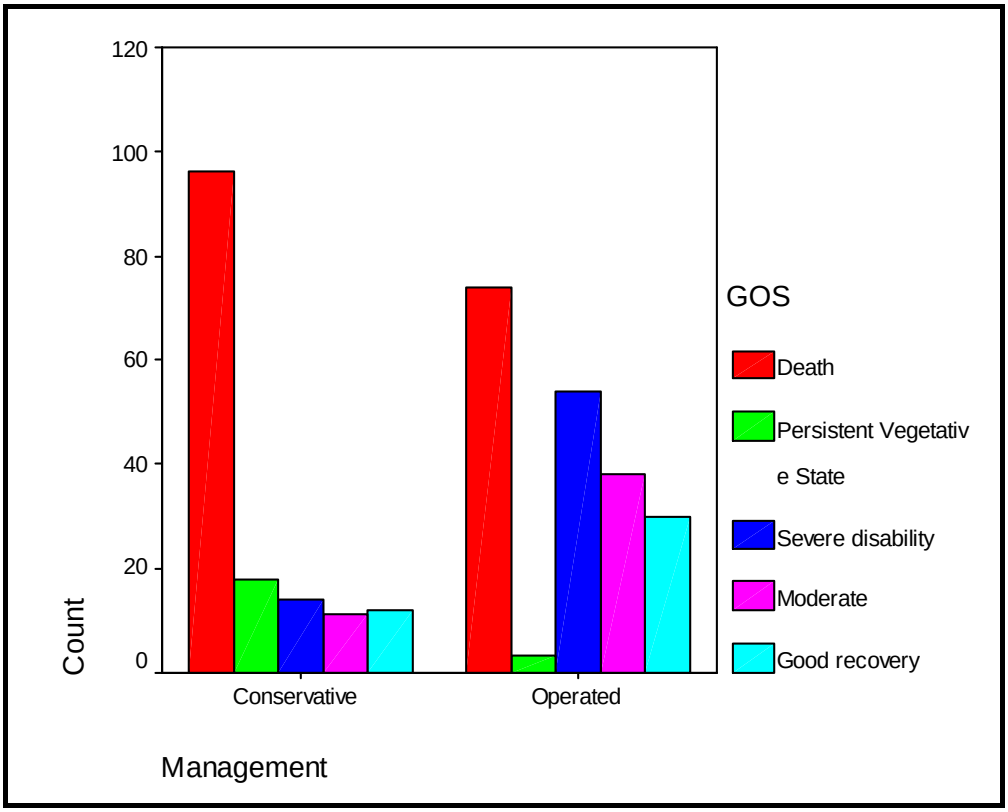


fig 16: The above figure showed the comparative analysis of management and their outcome in severe head injury patients.

Table 16 a: Statistical Analysis of Management Vs GOS

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.118(a)	4	.000
Likelihood Ratio	56.968	4	.000
Linear-by-Linear Association	31.025	1	.000
N of Valid Cases	350		

Applying Chi-Square test p value for management is p=<0.001.

DISCUSSION

In severe head injury patient in whom the GCS was $\leq$ 8.The patients outcome is most significant part of the treatment which may be surgical (or) conservative. There were many factors significantly influence the outcome of those patients.

In this study of 350 severe head injury patients the following factors were analysed before analyzing each factor the Over all outcome in this study was

GOS	Outcome		No.of Patients	Percentage
1.	Death	:	170 Patients	(48.6%)
2.	Persistant Vegitative State	:	21 Patients	(6%)
3.	Sever disability	:	68 Patients	(19.4%)
4.	Moderate disability	:	49 patients	(14%)
5.	Good recovery	:	42 Patient	(12%)

Nearly 50% of patients with GCS < 8 died (170 patients) nearly 35% of the patients had moderate (14%) and severe disability (19.4%)

Only 12% of the patients had good recovery and become independent. Severe injury to the brain predominantly contributes to death and vegetative states.

AGE:

In this study of 350 sever head injury patients majority of the patients were in the 3^{rd} decade – 101 (28.9%) patients then comes the 2^{nd} and 4^{th} decade patients they were 72 (20.6%) and 74 (21.1%) respectively.

But when comparing the outcome of the patient with each age group good recovery is maximum in 2^{nd} decade 13 (31.0%) patients followed by 3^{rd} and 4^{th} decade patients, they were 11 (26.2%) and 8 (19.0%) respectively.

Deaths were 47 to 48% in 3^{rd} and 4^{th} decade, in 6^{th} and 7^{th} decades death was >50%.

According to TCDB study (Traumatic coma data Bank)

Reaction of the aged brain to trauma may be apparently severe when compare to young patients brain.

Age was found to be an independent predictor after other factor were excluded.

Age is a strong factor influence both mortality and mobility.

SEX DISTRIBUTION

Majority of the patient were male due to their job of going out o make money for their improvement of life style.

In this study of 350 sever head injury patients the female head injury contributes only meager amount male, female ratio was 10:1.

MODE OF INJURY

- Motor vehicle accident were more common then any other mode
- In this study of 350 severe head injury patient MVA constitutes 272 (77.7%) patients, death and good recovery were more in MVA.
- The other modes were TA (7.4%), Fall (8.3%), Assault (6.6%) almost equal
- In comparison with other 3 modalities

- Outcome is more poor with train accident – 19 deaths (73.1%) and Outcome is better in injuries due to fall injuries – 7 good recovers (24.2%)

TIME INTERVAL

In severe head injury patients reaching the time to hospital is very important.

Every single minutes is very important in their life.

Time delay, detoriates further in their GCS score

Majority of the patients In this study were reached the hospital in 4 to 8 hours – 170 patients (48.6%), then 2 to 4 hours - 80 patients (22.9%), < 2 hours – 51 patients (14.6%)

But when comes the outcome of these patient best outcome were seen in < 2 hours group because good recovery in that group is 28 patient (66.7%), good recovery decreases further when the time increases 2 to 4 hours 10 patients (23.8%), after 8 hours there was no good recovery of the patients outcome.

Death gradually increases and reaches 73.2%, 85.7% and 100% as it progresses to >24 hrs

GCS

In this study , 65 severe head injury patients with initial GCS score of 3 died, poor GCS contributing to death.

Best outcome was seen in GCS-8, where 27 patient out of 56 were improved with GCS-15 (Good recovery) It was around 48.2%.

Then it drastically decreased and the good recovery in GCS 7 was only 6 patients (15.8%)

PUPILLARY SIZE

In this study severe head injury patients with symmetric pupil were 273 (78%) and contributed for good recovery. Patients with asymmetric pupil had poor outcome in the form of death (73 patients) persistent vegetative state (2 patients) and severe disability (2 patients). Asymmetric pupils contribute to poor outcome which is proved statistically also. (p=<0.001)

REACTION TO LIGHT

In this study of 350 severe head injury patients with RL pupils were 132 (37.7%) among those 39 patients were good recovery (29.5%) only 8 patients were died (6.1%). But either single (or) double side NRL pupils were total 218 (62.3%).

In this 162 patients were died (74.3%) only 3 patients had good recovery (1.4%).

Non reacting pupils to light indicated poor outcome (162 deaths in this study population) with significant p value of p=<0.001.

So, pupillary reaction to light plays a major role in outcome of the severe head injury patients.

DEM

In this study of 350 severe head injury patients DEM was present in 138 patients among those 40 (95.2%) patients had good recovery in 57 patients DEM was absent and all of them died.

Among DEM impaired patients only 2 (1.3%) patients had good recovery and 89 (57.4%) patients died.

So, DEM plays a major role in making best outcome in sever head injury patients.

DEM exactly predicts the brain stem function and a absent as well as impaired DEM, in severely injured patient resulted in death. Morethan 50% of study population died, with a statistical significant p value of p=<0.001.

MOTOR RESPONSE

Motor response is the sub score of GCS Score. It is predicts the outcome more accurately then the other 2 sub scores.

Motor response had five components

- 6. Obeying
- 5. Localising

- 4. Flexion to pain
- 3. decorticate posture
- 2. decerebrate posture
- 1. No response

In this study of 350 severe head injury patients Motor Response M1 had very poor outcome, All patients M1 had 100% mortality

Best outcome seen in M5, among 94 patients 33 (78.6%) patients with good recovery, as the motor response decreases M5-1 the death of the patients increased gradually upto 100% in M1 patients.

CT FINDINGS

CT scanning is routinely performed in all patient with severe TBI and provides information with important therapeutic implications for operative (or) non operative intervention.

Individual CT characteristic found to be particularly relevant in terms of prognosis were

1. Status of Basal cisterns

2. tSAH

3. Presence and degree of midline shift

4. Presence and type of intracranial lesions.

In this study of 350 severe head injury patients they were presented with many different CT scan findings of those, predominantly patients were presented with

Contusion - 126 (35%)

SDH - 122 (34.9%)

Then comes the others findings.

Among the contusion primary brain stem contusions were 37 patients.

Among the 37 patients with primary brain stem contusion all were treated conservatively and 4 of them had good recovery and 18 patients died.

All the 4 patients improved were having small hyperdense contusion.

Among the other contusions, they present in either single (or) multiple, multiple may be unilateral (or) bilateral.

58 patients were operated among those,7 patients were having good recovery, 29 patients died after surgery.

31 patients managed conservatively but among the 31, 30 patients were expired and 1 patient had PV state

DAI

Patients with severe head injury and CT brain plain normal study were considered in DAI category. among the 350 patients only 37 patients were having normal CT (12%).

They were all treated conservatively and 8 patients were having good recovery and 20 patient died.

EDH

In this study 27 patients had EDH and all of them underwent surgery, 10 patients who had good recovery, (8 patients with GCS 8 and 2 patients with GCS 7), while 9 patients had an outcome score of 4 (moderate disability).

SUBDURAL HEMATOMA (SDH)

This finding was most commonly seen n sever head injury patients next to contusions.

Among 122 patients with SDH of either right (or) left FTP region 114 patients operated (32.6%)

Of those 114 patients 13 patients were having good recovery and 38 patients were died

Only 8 patients with GCS 3 were managed conservatively but all the 8 patients were died during the study period.

OTHER FINDINGS

tSAH patients were totally 35(9.99%) of those all the Patients were treated conservatively

NO one of those 35 patients having good recovery

20 patients were died only 4 patients were having moderate disability

Patients with post traumatic ICH were only 3 patients (0.9%) all were manageful conservatively and they were expired during the study period.

ASSOCIATE INJURIES

In this study of 350 severe head injury patients, 79 patients were having other associated injures. Of those 79 patients 5 patients had good recovery 58 patients were died.

Those 5 patients were only having bony injuries not other major injuries like chest and abdominal injuries.

HB Status

In this study of 350 severe head injury patients, 78 patients were anemic (22.28%), of those 78 patients had good recovery and 58 patients expired.

So, Anemic patients with severe head injury will have poor outcome.

CO-MORBIDITY

In this study of 350 severe head injury patients, 39 patients were having other Co-morbid conditions like Diabetics / Hypertension.

Among those 39 patients 3 patients were having good recovery.

31 patients died, % of died patients were more in patients with co-morbid condition.

So, this co-morbid condition are strongly influencing outcome of sever head injury patients if present.

COAGULATION PROFILE

In this study of 350 severe head injury patients, 33 patient were having abnormal coagulation profile. They all were having multiple intra parenchymal contusion in the CT Brain.

Of those 33 patients only 2 patients were having good recovery.

2 patients had coagulopathy they underwent surgery after correcting the coagulation abnormality.

Rest of the 29 patients died and were on conservative line of management.

MANAGEMENT

In this study of 350 severe head injury patients majority of the sever head Injury patients were treated with surgical management.

199- patients were treated surgically (56.85%),

151- patients were treated conservatively (43.14%)

But, Patient with good recovery were maximum seen in surgically treated patients – 30 Patients (71.4%)

Death was maximum in those patients treated conservatively.

More than 50% of the study population underwent surgical management were as 30 patients had good recovery, deaths were more in conservatively managed patients and survived patients had poor outcome scores.

CONCLUSION

Prognostication of severe TBI relies on many factors

DEM and pupilary assessment at bed side are significant prognostic measures of severe TBI. Even though MVA are common causes of TBI Train Accidents injure the brain more probably due to the severe impact injury resulting in death of patients. GCS scoring on admission holds the main tool of clinical assessment and motor response assessment is a good marker of prognostication.

Survival is poor in poly trauma patients.

Hb status, co-morbid conditions and Haematological status also to be monitored in severe TBI.

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INSTITUTE OF NEUROLOGY

GOVERNMENT GENERAL HOSPITAL, CHENNAI

PROFORMA

Serial No:

Name: Age: MIN No: I.P. No:

Sex : M / F

Mode of Injury: RTA / ASSAULT / FALL FR HT / OBJ FALL / UK

In cases of RTA : 2 wheeler / 4 wheeler
Rider / Pillionaire
Helmet / No helmet
Alcoholic / Non alcoholic

Time interval between injury and admission:

History

History of loss of consciousness (LOC):
LOC in minutes :

History of vomiting – No. of episodes :
– Contents

History of seizure – Type of seizure :
– No. of episodes

History of Ear, Nose, Throat bleeding :

History of headache :

History of comorbidities :
(DM,SHT and chronic medical illness)

On examination

Admission Glasgow coma scale : <8
Pupillary light reaction :
DEM :
Motor response :
Other system :
External injuries :
Pulse : /mt
BP :
CVS :
RS :

Investigations

Blood investigations:

CBC:
RFT:
SERUM ELECTRLYTES:
COAGULATION PROFILE:
X ray skull – AP, lateral:

CT brain : Undisplaced fracture / Contusion

SAH /EDH /SDH

IVH / Gangliocapsular bleed

DAI

Management

Surgery or conservative management

Glasgow outcome score

Score		
5	Good recovery	
4	Moderate	
3	Severe disability	
2	Persistent Vegetative State	
1	Death	

NAME	AGE	SEX	MIN NO	MODE OF INJURY	TIME INTERVAL	GCS	PUPILS-SYM	PUPILS-RL	DEM	MOTOR RESPONSE	CT FINDINGS	OTHER ASS INJURIES	HB STATUS	CO MORBITIES	COAG PROFILE	MANAGEMENT	GOS
Jayakumar	34	M	10171	RTA	8	3	-	-	ABSENT	1	ICH-GANGLIO CAPSULAR WITH IVH	NO	A	YES-SHT	ABNORMAL	CONSERVATIVE	1
Gopalakrishnan	58	M	10221	RTA	10	3	+	-	ABSENT	1	ICH-GANGLIO CAPSULAR WITH IVH	NO	A	YES-SHT	ABNORMAL	CONSERVATIVE	1
Saeed	43	M	10227	RTA	8	8	+	-	IMP	5	CONTUSION-BRAINSTEM	YES-ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Ashokan	62	M	10252	RTA	14	8	+	-	IMP	5	ICH-GANGLIOCAPSULAR,IVH	YES-ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Subramani	65	M	10260	RTA	16	8	+	-	IMP	5	CONTUSION-BRAINSTEM	YES-ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Sakarapani	58	M	10263	RTA	18	8	+	-	IMP	5	SAH-DIFFUSE	YES-ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Purusothaman	57	M	10267	RTA	16	8	+	-	IMP	5	CONTUSION-BRAINSTEM	YES-ABD	A	YES DM	NORMAL	CONSERVATIVE	1
Krishnan	38	M	10277	RTA	3	3	-	-	ABSENT	1	CONTUSION-BRAINSTEM	YES-ABD	A	NO	NORMAL	CONSERVATIVE	1
Hari	62	M	10278	RTA	12	7	+	-	IMP	5	CONTUSION-LT GANGLIOCAPSULAR	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Kavitha	45	F	10284	RTA	12	7	+	-	IMP	5	CONTUSION-MULTIPLE	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Balaraman	38	M	10288	RTA	12	7	+	-	IMP	5	CONTUSION-MULTIPLE	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Vinoth	42	M	10331	RTA	12	7	+	-	IMP	5	CONTUSION-MULTIPLE	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Aravind	35	M	10333	RTA	12	7	+	-	IMP	5	CONTUSION-MULTIPLE	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Prabakar	43	M	10340	RTA	8	8	+	-	IMP	5	CONTUSION-MULTIPLE	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Sundaram	56	M	10351	RTA	12	8	+	-	IMP	5	CONTUSION-MULTIPLE	YES-BONE	A	NO	ABNORMAL	CONSERVATIVE	1
Hariharan	43	M	10357	TTA	2	4	-	-	ABSENT	2	SAH-DIFFUSE	YES-BONE,ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Ragunathan	32	M	10358	TTA	2	4	-	-	ABSENT	2	SAH-TENTORIAL	YES-BONE,ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Sankaran	64	M	10444	TTA	2	4	-	-	ABSENT	2	SAH-CISTERNAL	YES-BONE,ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Sargunan	65	M	10450	TTA	2	4	-	-	ABSENT	2	SAH-DIFFUSE	YES-BONE,ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Arivalagan	43	M	10453	TTA	2	4	-	-	ABSENT	2	SAH-DIFFUSE	YES-BONE,ABD	A	NO	ABNORMAL	CONSERVATIVE	1
Govindan	55	M	10457	RTA	3	3	-	-	ABSENT	1	CONTUSION-MULTIPLE	YES-CHEST,ABD	A	YES-SHT	ABNORMAL	CONSERVATIVE	1
Narayanan	72	M	10458	RTA	2	3	-	-	ABSENT	1	SDH-RT FTP	NO	NA	YES-DM,SHT	ABNORMAL	CONSERVATIVE	1
Ranganathan	45	M	10460	RTA	1	4	-	-	ABSENT	2	CONTUSION-BRAINSTEM	NO	NA	YES-SHT	ABNORMAL	CONSERVATIVE	1
Masilamani	28	M	10462	RTA	8	3	-	-	ABSENT	1	SDH LT FTP	yes-bony	NA	NO	ABNORMAL	CONSERVATIVE	1
Gajendran	42	M	10467	ASSALUT	5	5	+	-	IMP	3	COTUSION-BRAINSTEM	NO	A	NO	NORMAL	CONSERVATIVE	3
Ashok	22	M	10470	ASSALUT	5	5	+	-	IMP	3	COTUSION-BRAINSTEM	NO	A	NO	NORMAL	CONSERVATIVE	3
Payash	33	M	10471	ASSALUT	5	5	+	-	IMP	3	COTUSION-BRAINSTEM	NO	A	NO	NORMAL	CONSERVATIVE	3
Mohana	33	F	10478	FALL	5	5	+	-	IMP	3	COTUSION-BRAINSTEM	NO	A	NO	NORMAL	CONSERVATIVE	3
Noorbasha	43	M	10481	RTA	7	4	-	-	ABSENT	2	CONTUSION-BRAINSTEM	NO	A	YES-DM	NORMAL	CONSERVATIVE	1
Suresh	63	M	10488	RTA	5	5	+	-	IMP	3	COTUSION-BRAINSTEM	NO	A	NO	NORMAL	CONSERVATIVE	3
Jayaraman	38	M	10490	RTA	6	3	-	-	ABSENT	1	SAH-TENTORIUM,CISTERN	NO	A	NO	NORMAL	CONSERVATIVE	1
Balaji	36	M	10491	RTA	10	3	-	-	ABSENT	1	SAH-ANT&POST IHB	NO	A	NO	NORMAL	CONSERVATIVE	1
Kamalakannan	45	M	10494	RTA	6	3	-	-	ABSENT	1	CONTUSION-MULTIPLE	NO	A	YES-SHT	NORMAL	CONSERVATIVE	1
Lakshmanan	36	M	10500	RTA	7	3	+	-	ABSENT	1	CONTUSION-BIFRONTAL	YES-ABD	A	NO	NORMAL	CONSERVATIVE	1
Sundaram	42	M	10502	RTA	2	3	-	-	ABSENT	1	CONTUSION-BRAINSTEM	YES-ABD	A	NO	NORMAL	CONSERVATIVE	1
Sangavi	18	F	10504	TTA	3	3	-	-	ABSENT	1	SDH-LT FTP	YES-ABD,BONY,CHEST	A	NO	NORMAL	CONSERVATIVE	1
Kabali	43	M	10506	TTA	2	3	-	-	IMP	1	CONTUSION-BRAINSTEM	YES-ABD,CHEST	A	NO	NORMAL	CONSERVATIVE	1
Mani	54	M	10508	RTA	4	5	+	-	IMP	3	SAH-INTERHEMIS	YES-BONE	A	NO	NORMAL	CONSERVATIVE	2
Bindhu	28	F	10510	RTA	4	5	+	-	IMP	3	SAH-DIFFUSE	YES-BONE	A	NO	NORMAL	CONSERVATIVE	2
Sredharan	45	M	10512	RTA	4	5	+	-	IMP	3	SAH-RT SYLVIAN	YES-BONE	A	NO	NORMAL	CONSERVATIVE	2
Anbalagan	32	M	10518	RTA	4	5	+	-	IMP	3	SAH-DIFFUSE	YES-BONE	A	NO	NORMAL	CONSERVATIVE	2
Parthiban	19	M	10520	RTA	10	5	+	+	IMP	3	CONTUSION-MULTIPLE	YES-BONE	A	NO	NORMAL	CONSERVATIVE	1
Sulaiman	56	M	10521	RTA	10	5	+	+	IMP	3	CONTUSION-MULTIPLE	YES-BONE	A	YES-DM	NORMAL	CONSERVATIVE	1
Shanmugam	46	M	10528	RTA	10	5	+	+	IMP	3	CONTUSION-MULTIPLE	YES-BONE	A	NO	NORMAL	CONSERVATIVE	1
Pachaiammal	64	F	10530	RTA	10	5	+	+	IMP	3	CONTUSION-MULTIPLE	YES-BONE	A	NO	NORMAL	CONSERVATIVE	1
Balu	32	M	10533	RTA	10	5	+	+	IMP	3	CONTUSION-MULTIPLE	YES-BONE	A	NO	NORMAL	CONSERVATIVE	1
Kamatchi	56	F	10535	RTA	36	4	-	-	IMP	2	CONTUSION-BITEMPORAL	YES-BONY	A	YES-DM	NORMAL	CONSERVATIVE	1
Jayaprasad	22	M	10540	RTA	13	3	-	-	IMP	1	CONTUSION-RT FRONTAL,LT PARIETAL	YES-BONY	A	NO	NORMAL	CONSERVATIVE	1
Sadayan	56	M	10543	RTA	6	3	-	-	ABSENT	1	CONTUSION-LT TEMPORAL,RT THALAMIC	YES-BONY	A	NO	NORMAL	CONSERVATIVE	1
Pachaimuthu	52	M	10545	RTA	2	3	+	-	ABSENT	1	CONTUSION-BRAINSTEM	YES-BONY	A	YES-DM	NORMAL	CONSERVATIVE	1
Marimuthu	62	M	10550	RTA	8	3	+	-	ABSENT	1	CONTUSION-BRAINSTEM	YES-BONY,CHEST,FM	A	YES-SHT	NORMAL	CONSERVATIVE	1
Mehboobasha	26	M	10552	ASSAULT	2	4	+	-	IMP	2	SAH-RT SYLVIAN	NO	NA	NO	NORMAL	CONSERVATIVE	1
Victoria	52	F	10555	ASSAULT	12	6	+	-	PRESENT	4	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	1
Malliga	31	F	10557	ASSAULT	12	6	+	-	PRESENT	4	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	1
Ellappan	52	M	10560	ASSAULT	12	6	+	-	PRESENT	4	SAH-TENTORIAL	NO	NA	NO	NORMAL	CONSERVATIVE	1
Annamalai	36	M	10566	ASSAULT	12	6	+	-	PRESENT	4	SAH-SYLVIAN	NO	NA	NO	NORMAL	CONSERVATIVE	1
Babu	42	M	10567	ASSAULT	12	6	+	-	PRESENT	4	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	1
Ragavendra	23	M	10569	ASSAULT	7	3	-	-	IMP	1	SDH-RT FTP	NO	NA	NO	NORMAL	CONSERVATIVE	1
Selvendran	43	M	10661	ASSAULT	10	8	+	-	IMP	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	2
Waqar	32	M	10662	ASSAULT	3	3	+	-	IMP	1	CONTUSION-RT PARIETAL,RT TEMPORAL	NO	NA	NO	NORMAL	CONSERVATIVE	1
Ramanujam	26	M	10668	ASSAULT	5	3	+	-	ABSENT	1	FTP-RT FTP	NO	NA	NO	NORMAL	CONSERVATIVE	1
Manivasagam	25	M	10670	ASSAULT	4	8	+	+	PRESENT	5	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	5
Yuniskan	32	M	10673	ASSAULT	2	8	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5

NAME	AGE	SEX	MIN NO	MODE OF INJURY	TIME INTERVAL	GCS	PUPILS-SYM	PUPILS-RL	DEM	MOTOR RESPONSE	CT FINDINGS	OTHER ASS INJURIES	HB STATUS	CO MORBITIES	COAG PROFILE	MANAGEMENT	GOS
Govindan	22	M	10678	ASSAULT	4	8	+	+	PRESENT	5	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	5
Arumugam	55	M	10770	FALL	5	3	-	-	ABSENT	1	MULTIPLE-DIFFUSE SAH,RT FTP SDH,LT TEM FRAC	NO	NA	NO	NORMAL	CONSERVATIVE	1
Arumugam	32	M	10773	FALL	12	3	-	-	IMP	1	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Sabari	29	M	10775	FALL	8	5	+	-	PRESENT	3	SAH-LT SYLVIAN	NO	NA	NO	NORMAL	CONSERVATIVE	3
Parasuram	54	M	10777	FALL	6	3	-	-	ABSENT	1	SAH-DIFFUSE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Qadarali	48	M	10780	FALL	5	7	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Rajarajan	46	M	10783	FALL	3	3	-	-	ABSENT	1	CONTUSION-CEREBELLEM	NO	NA	YES-DM	NORMAL	CONSERVATIVE	1
Mohammed yusuf	32	M	10785	FALL	8	8	+	-	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Kavitha	18	F	10787	RTA	6	4	-	-	IMP	2	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Dineshkumar	42	M	10790	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Kavitha	18	F	10800	RTA	6	4	-	-	IMP	2	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Sathyaraj	36	M	10801	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Rajeshkannan	32	F	10805	RTA	5	3	-	-	ABSENT	1	CONTUSON-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	1
Shanthi	21	F	10807	RTA	6	4	-	-	IMP	2	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Babu	16	M	10810	RTA	10	4	+	+	IMP	2	SAH-DIFFUSE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Muniyandi	54	M	10812	RTA	12	3	-	-	IMP	1	SAH-DIFFUSE	NO	NA	YES-DM	NORMAL	CONSERVATIVE	1
Mahendran	36	M	10825	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Jacob	44	M	10826	RTA	4	3	-	-	ABSENT	1	CONTUSON-BRAINSTEM	NO	NA	YES-DM	NORMAL	CONSERVATIVE	1
Vanaja	44	F	10827	RTA	6	4	-	-	IMP	2	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Jawahar	18	M	10829	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Elliya	32	M	10830	RTA	12	3	-	-	ABSENT	1	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Radhika	22	F	10835	RTA	6	4	-	-	IMP	2	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Kathirvel	32	M	10837	RTA	3	3	-	-	IMP	1	SAH-TENTORIUM	NO	NA	NO	NORMAL	CONSERVATIVE	1
William	61	M	10840	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Chandru	19	M	10846	RTA	8	6	+	-	IMP	4	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Vijayakumar	34	M	10850	RTA	2	3	-	-	ABSENT	1	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Thanikachalam	46	M	10861	RTA	8	6	+	-	IMP	4	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Thangaraj	42	M	10867	RTA	4	3	-	-	ABSENT	1	SAH-ANT&POST IHB	NO	NA	YES-ASM	NORMAL	CONSERVATIVE	1
Kannan	32	M	10868	RTA	8	6	+	-	IMP	4	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Ramesh	57	M	10870	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Muthukani	46	M	10872	RTA	8	6	+	-	IMP	4	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Parameswaran	45	m	10878	RTA	4	6	+	+	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Sivasakthi	36	F	10880	RTA	6	4	-	-	IMP	2	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Senthilkumar	22	M	10891	RTA	4	6	+	+	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Dass	42	M	10893	RTA	8	4	+	-	IMP	2	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Rangan	45	m	10897	RTA	4	6	+	+	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Paramu	33	m	10901	RTA	4	6	+	+	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Ragu	32	M	10905	RTA	4	6	+	+	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Ravichandran	19	M	10907	RTA	2	6	+	-	IMP	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Pushpa	28	F	10910	RTA	2	3	-	-	IMP	1	CONTUSION-LT FRONTAL	NO	NA	NO	NORMAL	CONSERVATIVE	1
Selvan	26	M	10912	RTA	3	7	+	-	IMP	5	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	3
Saravanan	45	M	10914	RTA	3	7	+	-	IMP	5	SAH-ANTERIOR,POSTERIOR IHB	NO	NA	NO	NORMAL	CONSERVATIVE	3
Tamilselvan	42	M	10918	RTA	4	3	+	-	ABSENT	1	SDH-LT FTP	NO	NA	NO	NORMAL	CONSERVATIVE	1
Nirmala	36	M	10920	RTA	3	7	+	-	IMP	5	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	3
Selvan	39	M	10930	RTA	2	3	-	-	ABSENT	1	SDH-LT FTP	NO	NA	NO	NORMAL	CONSERVATIVE	1
Rajesh	19	M	10933	RTA	3	7	+	-	IMP	5	SAH-TENTORIUM	NO	NA	NO	NORMAL	CONSERVATIVE	3
Damodaran	22	M	10935	RTA	2	7	+	+	PRESENT	5	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	5
William	36	M	10938	RTA	3	7	+	-	IMP	5	SAH-SYLVIAN	NO	NA	NO	NORMAL	CONSERVATIVE	3
Gowthaman	22	M	10941	RTA	2	7	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Jawahar	26	M	10942	RTA	3	7	+	-	IMP	5	SAH-DIFFUSE	NO	NA	NO	NORMAL	CONSERVATIVE	3
Lalith	42	M	10945	RTA	2	5	+	+	PRESENT	3	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Parimala	43	F	10948	RTA	3	7	+	-	IMP	5	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	3
Deepak	19	M	10951	RTA	3	5	+	-	IMP	3	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Prabhu	52	M	10954	RTA	14	8	+	-	IMP	5	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	2
Dhanapal	64	M	10958	RTA	12	3	+	-	IMP	1	SDH LT FTP	NO	NA	NO	NORMAL	CONSERVATIVE	1
Thomas	38	M	10961	RTA	8	8	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	3
Sekar	42	M	10966	RTA	3	5	+	-	IMP	3	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Paulraj	36	M	10968	RTA	8	3	+	-	IMP	1	COTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Manivannan	29	M	10971	RTA	2	8	+	+	PRESENT	5	SAH-TENTORIAL	NO	NA	NO	NORMAL	CONSERVATIVE	4
Raja	19	M	10972	RTA	2	8	+	+	PRESENT	5	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	4
Inbarasan	39	M	10981	RTA	2	8	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	4
Tamilselvan	46	M	10987	RTA	2	8	+	+	PRESENT	5	SAH-CISTERNAL	NO	NA	NO	NORMAL	CONSERVATIVE	4
Dineshkumar	26	M	10989	RTA	2	8	+	+	PRESENT	5	SAH-TENTORIAL	NO	NA	NO	NORMAL	CONSERVATIVE	4

NAME	AGE	SEX	MIN NO	MODE OF INJURY	TIME INTERVAL	GCS	PUPILS-SYM	PUPILS-RL	DEM	MOTOR RESPONSE	CT FINDINGS	OTHER ASS INJURIES	HB STATUS	CO MORBITIES	COAG PROFILE	MANAGEMENT	GOS
Dass	38	M	10991	RTA	2	3	-	-	IMP	1	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Siva	26	M	10995	RTA	6	4	-	-	ABSENT	2	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Yamini	36	F	10997	RTA	3	5	+	-	IMP	3	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Vasudevan	21	M	11000	RTA	6	4	-	-	ABSENT	2	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Kaliyaperumal	55	M	11001	RTA	6	3	-	-	ABSENT	1	CONTUSION-BRAINSTEM	NO	NA	YES-DM	NORMAL	CONSERVATIVE	1
Surya	26	M	11005	RTA	3	5	+	-	IMP	3	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Sathyaraj	42	M	11008	RTA	3	5	+	-	IMP	3	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Dinakar	36	M	11009	RTA	4	3	-	-	IMP	1	SAH-DIFFUSE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Kandasami	42	M	11010	RTA	6	4	-	-	ABSENT	2	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Maheswaran	36	M	11013	RTA	2	8	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Kuppan	24	M	11018	RTA	6	4	-	-	ABSENT	2	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Raghavan	36	M	11019	RTA	6	4	-	-	ABSENT	2	CONTUSION-MULTIPLE	NO	NA	NO	NORMAL	CONSERVATIVE	1
Annamalai	63	M	11020	FALL	3	6	+	-	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Ganesan	39	M	11021	TTA	3	6	+	-	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Rajkumar	18	M	11025	TTA	3	6	+	-	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Sekar	41	M	11028	TTA	3	6	+	-	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Mohan	35	M	11029	TTA	3	6	+	-	PRESENT	4	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	1
Murugan	42	M	11034	TTA	4	7	-	-	IMP	5	CONTUSION-BRAINSTEM	NO	NA	NO	NORMAL	CONSERVATIVE	2
Raman	56	M	11037	TTA	2	8	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Sadagopan	56	M	11039	TTA	2	8	+	+	PRESENT	5	DAI	NO	NA	NO	NORMAL	CONSERVATIVE	5
Sekar	66	M	11042	TTA	2	8	+	+	PRESENT	5	CONTUSION-BRAINSTEM	NO	NA	YES-DM,SHT	NORMAL	CONSERVATIVE	5
Balaji	22	M	11045	RTA	6	3	+	-	ABSENT	1	CONTUSON-BRAINSTEM	YES-BONY	NA	NO	NORMAL	CONSERVATIVE	1
Muthu	42	M	11047	RTA	6	3	+	+	IMP	1	CONTUSION-LT THALAMIC,LT OCCIPITAL	YES-BONY	NA	NO	NORMAL	CONSERVATIVE	1
Manohar	43	M	11048	RTA	7	3	-	-	IMP	1	CONTUSION-BRAINSTEM	YES-BONY	NA	YES-DM	NORMAL	CONSERVATIVE	1
Baskaran	43	M	11053	TTA	2	3	-	-	ABSENT	1	DAI	YES-BONY,CHEST	NA	NO	NORMAL	CONSERVATIVE	1
Srikanth	32	M	11056	RTA	4	7	+	-	IMP	5	SDH-B/L FTP	YES-ABD,CHEST	A	NO	ABNORMAL	OPERATED	3
Vishwanathan	26	M	11059	FALL	6	6	+	-	PRESENT	4	CONTUSION-LT TEMPORAL	YES-BONE	A	NO	ABNORMAL	OPERATED	1
Ravanan	62	M	11063	FALL	6	6	+	-	PRESENT	4	CONTUSION-LT TEMPORAL	YES-BONE	A	NO	ABNORMAL	OPERATED	1
Srinivasan	46	M	11065	FALL	6	6	+	-	PRESENT	4	CONTUSION-LT TEMPORAL	YES-BONE	A	NO	ABNORMAL	OPERATED	1
Vetrivel	39	M	11067	FALL	6	6	+	-	PRESENT	4	CONTUSION-LT TEMPORAL	YES-BONE	A	NO	ABNORMAL	OPERATED	1
Arul	52	M	11072	RTA	12	7	+	-	IMP	5	CONTUSION-LT FRONTAL,LT TEMPORAL	YES-BONE	A	YES-SHT	ABNORMAL	OPERATED	1
Nandagopal	44	M	11073	FALL	3	8	+	+	PRESENT	5	CONTUSION-BIFRONTAL	NO	NA	YES-DM	ABNORMAL	OPERATED	5
Chandran	52	M	11077	RTA	4	3	-	-	IMP	1	EDH-RT PARIETO OCCI	NO	NA	NO	NORMAL	OPERATED	1
Jayaraman	52	M	11079	RTA	5	3	-	-	ABSENT	1	SDH-LT FTP	YES-ABD	NA	YES-DM	ABNORMAL	OPERATED	1
Subbaiah	66	M	11081	RTA	3	3	-	-	IMP	1	COTUSION-RT TEMPORAL	NO	A	YES-DM	NORMAL	OPERATED	1
Ranjith	23	M	11085	RTA	12	3	+	-	ABSENT	1	CONTUSION-LT FTP	NO	A	YES-DM	NORMAL	OPERATED	1
Mohan	33	M	11088	RTA	6	5	+	-	IMP	3	SDH-RT FTP	YES-ABD	A	NO	NORMAL	OPERATED	3
RajendraN	72	M	11091	RTA	6	5	+	-	IMP	3	SDH-RT FTP	YES-ABD	A	NO	NORMAL	OPERATED	3
Raghu	17	M	11096	RTA	6	5	+	-	IMP	3	SDH-RT FTP	YES-ABD	A	NO	NORMAL	OPERATED	3
Cibi	53	M	11099	RTA	6	5	+	-	IMP	3	SDH-RT FTP	YES-ABD	A	NO	NORMAL	OPERATED	3
Subramani	43	M	11101	RTA	6	5	+	-	IMP	3	SDH-RT FTP	YES-ABD	A	NO	NORMAL	OPERATED	3
Ganesamoorthy	28	M	11105	TTA	3	8	+	+	PRESENT	5	SDH LT FTP	YES-ABD	A	NO	NORMAL	OPERATED	5
Malaravan	39	M	11109	FALL	12	3	-	-	ABSENT	1	CONTUSION-BIFRONTAL	YES-BONE	A	NO	NORMAL	OPERATED	1
Thulasirajan	45	M	11111	RTA	3	8	+	+	PRESENT	5	SDH-RT FTP	YES-BONE	A	NO	NORMAL	OPERATED	5
Selvam	52	M	11114	RTA	3	8	+	+	PRESENT	5	SDH-RT FTP	YES-BONE	A	NO	NORMAL	OPERATED	5
Sakthivel	32	M	11117	RTA	2	8	+	+	PRESENT	5	EDH-RT TEMPERO PARIETAL	YES-BONE	A	NO	NORMAL	OPERATED	5
Srinivasan	56	M	11119	RTA	6	4	+	-	IMP	2	SDH-RT FTP	YES-BONY	A	YES-DM	NORMAL	OPERATED	1
Erasappan	54	M	11121	RTA	6	4	+	-	IMP	2	SDH-RT FTP	YES-BONY	A	YES-DM	NORMAL	OPERATED	1
Jayaraman	38	M	11123	RTA	6	4	+	-	IMP	2	SDH-RT FTP	YES-BONY	A	YES-DM	NORMAL	OPERATED	1
Nagaraj	37	M	11125	RTA	8	3	-	-	ABSENT	1	SDH-RT FTP	YES-BONY	A	NO	NORMAL	OPERATED	1
Thangappan	64	M	11128	RTA	6	4	+	-	IMP	2	SDH-RT FTP	YES-BONY	A	YES-DM	NORMAL	OPERATED	1
Muthu	35	M	11130	RTA	6	4	+	-	IMP	2	SDH-RT FTP	YES-BONY	A	YES-DM	NORMAL	OPERATED	1
Sulaiman	56	M	11134	RTA	6	4	+	-	IMP	2	SDH-RT FTP	YES-BONY	A	YES-DM	NORMAL	OPERATED	1
Thambirajan	52	M	11138	RTA	4	4	+	-	IMP	2	CONTUSION-RT FRONTAL	YES-BONY	A	NO	NORMAL	OPERATED	1
Subramani	53	M	11140	RTA	4	4	+	-	IMP	2	CONTUSION-LT FRONTAL	YES-BONY	A	NO	NORMAL	OPERATED	1
Raja	23	M	11143	RTA	4	4	+	-	IMP	2	CONTUSION-RT FRONTAL	YES-BONY	A	NO	NORMAL	OPERATED	1
Karthik	16	M	11147	RTA	4	4	+	-	IMP	2	CONTUSION-RT FRONTAL	YES-BONY	A	NO	NORMAL	OPERATED	1
Sudakar	45	M	11152	RTA	3	8	+	+	PRESENT	5	SDH-RT FTP	YES-CHEST	A	YES-SHT	NORMAL	OPERATED	5
Muthurangan	42	M	11156	ASSAULT	4	4	-	-	IMP	2	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	3
Kalaiselvi	23	F	11157	ASSAULT	2	6	+	+	PRESENT	4	SDH- LT FTP	NO	NA	NO	NORMAL	OPERATED	5
Narayanan	32	M	11159	ASSAULT	4	8	+	+	PRESENT	5	EDH-LT PARIETAL	NO	NA	NO	NORMAL	OPERATED	4
Poovendan	53	M	11164	ASSAULT	8	3	-	-	IMP	1	SDH LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Natraj	45	M	11165	ASSAULT	4	5	+	-	IMP	3	CONTUSION-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1

NAME	AGE	SEX	MIN NO	MODE OF INJURY	TIME INTERVAL	GCS	PUPILS-SYM	PUPILS-RL	DEM	MOTOR RESPONSE	CT FINDINGS	OTHER ASS INJURIES	HB STATUS	CO MORBITIES	COAG PROFILE	MANAGEMENT	GOS
Fleming	26	M	11168	ASSAULT	4	5	+	-	IMP	3	CONTUSION-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Sudalai	19	M	11172	ASSAULT	4	5	+	-	IMP	3	CONTUSION-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Venkatesan	54	M	11175	FALL	8	3	-	-	IMP	1	SDH-RT FTP	NO	NA	YES-DM	NORMAL	OPERATED	1
Venkatesan	18	M	11178	FALL	2	4	-	-	IMP	2	CONTUSION-BIFRONTAL	NO	NA	NO	NORMAL	OPERATED	3
Ramanathan	42	M	11181	FALL	18	3	-	-	IMP	1	CONTUSION-BIFRONTAL	NO	NA	YES-SHT	NORMAL	OPERATED	1
Venkatesan	31	M	11184	FALL	6	6	+	-	PRESENT	4	CONTUSION-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Bharathi	25	F	11188	FALL	2	6	+	+	PRESENT	4	EDH-POSTERIOR FOSSA	NO	NA	NO	NORMAL	OPERATED	5
Farooq	36	M	11190	FALL	4	7	+	+	PRESENT	5	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	4
Gowrisankar	22	M	11192	FALL	2	5	+	+	PRESENT	3	EDH-LT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	5
Selvaraj	56	M	11196	FALL	2	8	+	+	PRESENT	5	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	5
Kannan	36	M	11198	FALL	8	4	+	-	IMP	2	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	1
Vikram	22	M	11202	FALL	8	4	+	-	IMP	2	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	1
Subramani	44	M	11206	FALL	2	8	+	+	PRESENT	5	CONTUSION-LT FRONTAL	NO	NA	NO	NORMAL	OPERATED	5
Vendan	61	M	11209	FALL	8	4	+	-	IMP	2	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	1
Sundaramoorthi	46	M	11211	FALL	8	4	+	-	IMP	2	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	1
Jayaprakash	36	M	11213	FALL	2	8	+	+	PRESENT	5	CONTUSION-LT FRONTAL	NO	NA	NO	NORMAL	OPERATED	5
Damodaran	22	M	11216	FALL	8	4	+	-	IMP	2	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	1
Senthil	31	M	11219	RTA	8	4	-	+	IMP	2	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	2
Parimala	33	F	11220	RTA	8	6	+	-	PRESENT	4	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Kamalakannan	19	M	11227	RTA	6	4	+	-	IMP	2	CONTUSION-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	2
Baskaran	18	M	11229	RTA	10	5	+	+	IMP	3	CONTUSION-RT TEMPORAL,BURST LOBE	NO	NA	NO	NORMAL	OPERATED	3
Deepak	32	M	11230	RTA	10	5	+	+	IMP	3	CONTUSION-LT TEMPORAL,BURST LOBE	NO	NA	NO	NORMAL	OPERATED	3
Rangan	45	M	11232	RTA	7	4	-	-	ABSENT	2	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Krishnan	52	M	11238	RTA	10	5	+	+	IMP	3	CONTUSION-LT TEMPORAL,BURST LOBE	NO	NA	NO	NORMAL	OPERATED	3
Lingam	39	M	11241	RTA	9	5	+	-	IMP	3	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	3
Munusamy	54	M	11246	RTA	9	5	+	-	IMP	3	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	3
George	42	M	11248	RTA	10	5	+	+	IMP	3	CONTUSION-LT TEMPORAL,BURST LOBE	NO	NA	NO	NORMAL	OPERATED	3
Shanthi	22	F	11251	RTA	9	5	+	-	IMP	3	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	3
Vinoth	23	M	11258	RTA	2	4	-	-	ABSENT	2	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Sathish	38	M	11263	RTA	8	6	+	-	PRESENT	4	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Jaganathan	42	M	11265	RTA	10	5	+	+	IMP	3	CONTUSION-LT TEMPORAL,BURST LOBE	NO	NA	NO	NORMAL	OPERATED	3
Ravichandran	36	M	11267	RTA	6	4	+	+	IMP	2	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Prabhakaran	33	M	11269	RTA	9	5	+	-	IMP	3	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	3
Mohan	22	M	11271	RTA	9	5	+	-	IMP	3	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	3
Ramanathan	35	M	11273	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Janakiraman	65	M	11278	RTA	3	5	+	+	PRESENT	3	EDH-POST FOSSA	NO	NA	NO	NORMAL	OPERATED	3
Elumalai	46	M	11280	RTA	6	4	-	-	ABSENT	2	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	1
Damodaran	36	M	11284	RTA	8	6	+	-	PRESENT	4	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Sarath	25	M	11286	RTA	8	6	+	-	PRESENT	4	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Venkatesh	26	M	11287	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Abdul	33	M	11290	RTA	8	6	+	-	PRESENT	4	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Govindan	41	M	11297	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Muthukrishnan	46	M	11299	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Navya	19	M	11302	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Thambirajan	36	M	11306	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Kalaiselvi	32	M	11308	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Saravanan	17	M	11316	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	YES-DM	NORMAL	OPERATED	3
Munusami	62	M	11319	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Jeganathan	43	M	11322	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	YES-DM	NORMAL	OPERATED	3
Ramasami	33	M	11326	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	NO	NORMAL	OPERATED	3
Vijayakumar	21	M	11328	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Manikandan	17	M	11330	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	NO	NORMAL	OPERATED	3
Anbu	53	M	11337	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Ravichandran	66	M	11337	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	YES-SHT	NORMAL	OPERATED	3
Thangavelu	35	M	11339	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	NO	NORMAL	OPERATED	3
Pandiyan	62	M	11342	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Mahesh	26	M	11345	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Senthilkumar	31	M	11346	RTA	6	4	-	-	ABSENT	2	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	1
Ramanathan	62	M	11349	RTA	5	6	+	+	PRESENT	4	CONTUSION-RT FRONTAL,TEMPORAL	NO	NA	YES-DM	NORMAL	OPERATED	3
Madan	22	M	11352	RTA	5	3	+	-	IMP	1	CONTUSION-BIFRONTAL	NO	NA	NO	NORMAL	OPERATED	1
Vijayan	36	M	11357	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Ramuthai	22	F	11359	RTA	8	3	-	-	IMP	1	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Anthoni	55	M	11368	RTA	6	6	+	+	IMP	4	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	4

NAME	AGE	SEX	MIN NO	MODE OF INJURY	TIME INTERVAL	GCS	PUPILS-SYM	PUPILS-RL	DEM	MOTOR RESPONSE	CT FINDINGS	OTHER ASS INJURIES	HB STATUS	CO MORBITIES	COAG PROFILE	MANAGEMENT	GOS
Manikandan	32	M	11369	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Kotti	46	M	11378	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Thangaraj	22	M	11379	RTA	7	3	-	-	IMP	1	CONTUSION-RT FRONTAL,RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Raman	22	M	11380	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Ragavi	32	F	11385	RTA	6	6	+	+	IMP	4	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	4
Vairam	62	M	11395	RTA	10	3	-	-	ABSENT	1	SDH-LT FTP	NO	NA	YES-SHT	NORMAL	OPERATED	1
Sudhakar	18	M	11398	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Vadivel	18	M	11401	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Parasuram	38	M	11405	RTA	5	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Gopalakrishnan	64	M	11407	RTA	6	6	+	+	IMP	4	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	4
Ramasami	52	M	11413	RTA	4	6	+	+	PRESENT	4	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	4
Sridar	19	M	11418	RTA	5	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Ragu	31	M	11419	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Mani	62	M	11423	RTA	6	6	+	+	IMP	4	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	4
Suresh	32	M	11427	RTA	5	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Kasi	50	M	11428	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Rajesh	31	M	11430	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Sankaran	36	M	11435	RTA	8	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Velumani	40	M	11437	RTA	6	6	+	+	IMP	4	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	4
Shadiq	32	M	11439	RTA	4	6	+	+	PRESENT	4	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	4
Parasuram	44	M	11442	RTA	2	6	+	+	PRESENT	4	EDH-LT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	5
Ramasami	32	M	11447	RTA	4	8	+	+	PRESENT	5	EDH-LT PARIETAL	NO	NA	NO	NORMAL	OPERATED	4
Selvaraj	41	M	11448	RTA	5	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Ganapathi	55	M	11452	RTA	6	6	+	+	IMP	4	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	4
Ramasami	42	M	11453	RTA	6	4	+	-	IMP	2	SDH-LT FDP	NO	NA	NO	NORMAL	OPERATED	1
Palani	65	M	11456	RTA	5	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Boopathi	22	M	11458	RTA	4	6	+	+	PRESENT	4	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	4
Balaji	22	M	11469	RTA	5	6	+	+	PRESENT	4	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Rajkumar	28	M	11470	RTA	4	6	+	+	PRESENT	4	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	4
Mani	17	M	11472	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
John	21	M	11476	RTA	4	6	+	+	PRESENT	4	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	4
Hari	26	M	11478	RTA	6	4	+	-	IMP	2	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Sabarisan	35	M	11480	RTA	3	3	+	-	ABSENT	1	CONTUSION-RT TEMPORAL,BURST LOBE	NO	NA	NO	NORMAL	OPERATED	1
Babu	26	M	11483	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Malliga	26	F	11487	RTA	6	4	+	-	IMP	2	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Jegan	26	M	11488	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Sakthi	38	M	11490	RTA	7	3	-	-	IMP	1	CONTUSION-RT FRONTAL,RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Raja	37	M	11491	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Krishnakumar	23	M	11492	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Sudir	19	M	11493	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Vasudevan	28	M	11494	RTA	4	8	+	+	PRESENT	5	EDH-LT PARIETAL	NO	NA	NO	NORMAL	OPERATED	4
Nandhini	28	F	11495	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Aanandhi	42	F	11503	RTA	5	7	+	-	IMP	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Elagovan	33	M	11513	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Ranjith	26	M	11524	RTA	8	5	+	-	PRESENT	3	CONTUSION-BIFRONTAL	NO	NA	NO	NORMAL	OPERATED	1
Xavier	18	M	11525	RTA	2	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	5
Kamalakannan	42	M	11530	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Meenatchi	26	F	11543	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Akilan	36	M	11547	RTA	8	5	+	-	PRESENT	3	CONTUSION-BIFRONTAL	NO	NA	NO	NORMAL	OPERATED	1
Suyambu	33	M	11550	RTA	2	5	+	+	PRESENT	3	EDH-LT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	5
Sarath	23	M	11554	RTA	8	5	+	-	ABSENT	3	CONTUSION-RT CEREBELLUM	NO	NA	NO	NORMAL	OPERATED	1
Vadivel	33	M	11557	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Zahir hussain	32	M	11581	RTA	9	3	-	-	IMP	1	CONTUSION-RT FRONTAL,RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Chidambaram	32	M	11585	RTA	2	7	+	+	PRESENT	5	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	5
Naveenkumar	23	M	11587	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	5
Radhakrishnan	52	M	11590	RTA	8	5	+	-	PRESENT	3	CONTUSION-BIFRONTAL	NO	NA	NO	NORMAL	OPERATED	1
Elagovan	33	M	11596	RTA	2	7	+	+	PRESENT	5	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	5
Karunanithi	52	M	11597	RTA	5	5	+	+	PRESENT	3	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Sakthivel	28	M	11599	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	5
Subramani	45	M	11600	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Nandagopal	26	M	11602	RTA	3	7	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	4
Ravi	33	M	11606	RTA	8	5	+	-	PRESENT	3	CONTUSION-RT TEMPARO PARIETAL	NO	NA	NO	NORMAL	OPERATED	1
Jayasingh	42	M	11607	RTA	8	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3

NAME	AGE	SEX	MIN NO	MODE OF INJURY	TIME INTERVAL	GCS	PUPILS-SYM	PUPILS-RL	DEM	MOTOR RESPONSE	CT FINDINGS	OTHER ASS INJURIES	HB STATUS	CO MORBITIES	COAG PROFILE	MANAGEMENT	GOS
Ragavan	36	M	11609	RTA	4	8	+	+	PRESENT	5	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	4
Srinivasan	41	M	11612	RTA	9	3	-	-	IMP	1	CONTUSION-RT FRONTAL,RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	1
Jothi	36	F	11613	RTA	8	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Senthilkumar	36	M	11618	RTA	8	8	+	+	PRESENT	5	CONTUSION-RT FRONTAL	NO	NA	NO	NORMAL	OPERATED	3
Sureshkumar	28	M	11619	RTA	4	8	+	+	PRESENT	5	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	4
Sivakumar	55	M	11627	RTA	8	8	+	+	PRESENT	5	CONTUSION-RT PARIETAL,RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	3
Unnikrishnan	36	M	11645	RTA	4	8	+	+	PRESENT	5	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	4
Karthikeyan	21	M	11667	RTA	4	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	5
Rina	42	F	11678	RTA	8	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Mahendran	52	M	11687	RTA	6	8	+	+	PRESENT	5	CONTUSION-RT PARIETAL	NO	NA	NO	NORMAL	OPERATED	5
Kesavan	56	M	11698	RTA	8	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Mariyapan	65	M	11706	RTA	4	3	+	-	ABSENT	1	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	1
Anand	36	M	11708	RTA	8	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Madan	32	M	11712	RTA	8	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	3
Vairavan	43	M	11727	RTA	5	8	+	+	PRESENT	5	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	5
Prakash	22	M	11733	RTA	2	8	+	+	PRESENT	5	EDH-RT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	5
Latha	36	F	11738	RTA	2	8	+	+	PRESENT	5	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	5
Saranyan	23	M	11739	RTA	8	3	-	-	ABSENT	1	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	1
Nirmala	32	F	11742	RTA	2	8	+	+	PRESENT	5	CONTUSION-LT FRONTAL	NO	NA	NO	NORMAL	OPERATED	5
Vadivel	56	M	11747	RTA	2	8	+	+	PRESENT	5	EDH-LT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	5
Mahesh	19	M	11757	RTA	2	8	+	+	PRESENT	5	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	5
Selvan	42	M	11759	RTA	8	3	-	-	ABSENT	1	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	1
Thangaraj	42	M	11767	RTA	2	8	+	+	PRESENT	5	EDH-RT TEMPERO PARIETAL	NO	NA	NO	NORMAL	OPERATED	5
Ragupathy	22	M	11770	RTA	8	3	-	-	ABSENT	1	SDH-RT FTP	NO	NA	NO	NORMAL	OPERATED	1
Boopalan	21	M	11776	TTA	1	6	+	-	IMP	4	SDH-LT FTP	NO	NA	NO	NORMAL	OPERATED	5
Munusamy	48	M	11779	TTA	8	7	+	-	IMP	5	SDH-LT FTP	NO	NA	YES-DM,SHT	NORMAL	OPERATED	2
Karthik	21	M	11786	RTA	12	7	+	-	IMP	5	CONTUSION-BIFRONTAL	YES-ABD	NA	NO	NORMAL	OPERATED	1
Vignesh	23	M	11789	RTA	5	7	+	-	IMP	5	SDH-RT FTP	YES-BONE	NA	NO	NORMAL	OPERATED	3
Sudha	59	F	11796	RTA	5	7	+	-	IMP	5	SDH-RT FTP	YES-BONE	NA	NO	NORMAL	OPERATED	3
Sudakar	32	M	11798	RTA	5	7	+	-	IMP	5	SDH-RT FTP	YES-BONE	NA	NO	NORMAL	OPERATED	3
Bijesh	23	M	11883	RTA	5	7	+	-	IMP	5	SDH-RT FTP	YES-BONE	NA	NO	NORMAL	OPERATED	3
Vairam	45	M	11887	RTA	5	7	+	-	IMP	5	SDH-LT FTP	YES-BONE	NA	NO	NORMAL	OPERATED	3
Kaalidas	70	M	11897	RTA	5	7	+	-	IMP	5	SDH-RT FTP	YES-BONE	NA	NO	NORMAL	OPERATED	3
Vasanthraj	42	M	11897	TTA	3	3	-	-	ABSENT	1	SDH-RT FTP	YES-CHEST	NA	NO	NORMAL	OPERATED	1
Raja rajan	23	M	11900	RTA	3	7	+	+	PRESENT	5	EDH-LT TEMPORAL	NO	NA	NO	NORMAL	OPERATED	5

INFORMATION SHEET

We are conducting ***"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS LESS THAN 8"*** among patients attending Rajiv Gandhi Government General Hospital, Chennai and for that your specimen may be valuable to us.

The purpose of this study is to analyse ***"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS LESS THAN 8"*** and to evaluate about the intervention which is needed.

- We are selecting certain cases and if your clinical condition is found eligible, we may be using your blood sample to perform extra tests and special studies which in any way do not affect your final report or management.
- The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.
- Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.
- The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of investigator Signature of participant

Date:

<u>ஆராய்ச்சி தகவல் தாள்</u>

- தங்களின் சிடி ஸ்கேன் / எம்.ஆர்.ஐ ஸ்கேன் படம் அல்லது படத்தின் நகல் அல்லது படத்தின் நிழல்படம் இங்கு பெறப்பட்டுள்ளது

ராஜீவ் காந்தி அரசு மருத்துவக்கல்லூரி மற்றும் அரசு பொது மருத்துவமனையின் நரம்பியல் அறுவை சிகிச்சைத் துறையில் ***"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS LESS THAN 8"*** பற்றிய ஆய்வு நடைபெறுகிறது

- சிடி ஸ்கேன், மற்றும் எம்.ஆர்.ஐ ஸ்கேன் ஆகியவற்றின் அடிப்படையில் இந்த ஆய்வு நடைபெறுகிறது
- இவ்வாய்வில் கலந்து கொள்பவர்களின் சொந்த தகவல்கள் ரகசியமாக பாதுக்காகபடும்
- இந்த ஆய்வின் முடிவுகளை பிரசுரிக்குபோது அல்லது வெளியிடும்போதோ தங்களின் சொந்த தகவல்கள் ஏதும் வெளியிடபடாது
- இந்த ஆய்வில் பங்குபெற அல்லது விலகிக்கொள்ள உங்களுக்கு முழு சுதந்திரம் உண்டு
- இந்த ஆய்வில் இருந்து நீங்கள் விலகிகொண்டாலும் உங்களுக்கு கிடைக்கவேண்டிய சிகிச்சை தொடர்ந்து கிடைக்கும்

ஆராய்ச்சியாளர் கையொப்பம்பங்கேற்பாளர் கையொப்பம்

நாள்

<u>ஆராய்ச்சி ஒப்புதல் கடிதம்</u>

ஆராய்ச்சி தலைப்பு : *"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS LESS THAN 8"* பற்றிய ஆய்வு

பெயர் : வயது / பால் : **தேதி :**

ஆராய்ச்சி சேர்க்கை எண் :

- ராஜீவ் காந்தி அரசு மருத்துவக்கல்லூரி மற்றும் அரசு பொது மருத்துவமனையின் நரம்பியல் அறுவை சிகிச்சைத் துறையில் ***"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS LESS THAN 8"*** பற்றிய ஆய்வு நடைபெறுகிறது என்பதை அறிந்து கொண்டேன்
- சிடி ஸ்கேன், மற்றும் எம்.ஆர்.ஐ ஸ்கேன் ஆகியவற்றின் அடிப்படையில் இந்த ஆய்வு நடைபெறுகிறது என்பதையும் மேலும் அறுவை சிகிச்சையின் போது நேரடியாக பார்க்கப்படுவதை வைத்தும் ஆய்வு நடைபெறுகிறது என்பதையும் அறிந்து கொண்டேன்
- இவ்வாய்வில் கலந்து கொள்பவர்களின் சொந்த தகவல்கள் ரகசியமாக பாதுக்காகபடும் என்பதையும் இந்த ஆய்வின் முடிவுகளை பிரசுரிக்குபோது அல்லது வெளியிடும்போதோ தங்களின் எனது தகவல்கள் ஏதும் வெளியிடபடாது என்பதையும் அறிந்து கொண்டேன்
- இந்த ஆராய்ச்சியிலிருந்து எந்த நேரமும் பின் வாங்கலாம் என்றும், அதனால் எந்த பாதிப்பும் எற்படாது என்பதையும் அறிந்து கொண்டேன்
- இந்த ஆய்வில் பங்குபெற அல்லது விலகிக்கொள்ள எனக்கு முழு சுதந்திரம் உண்டு என்பதையும், இந்த ஆய்வில் இருந்து நான் விலகிகொண்டாலும் எனக்கு கிடைக்கவேண்டிய சிகிச்சை தொடர்ந்து கிடைக்கும் என்பதையும் அறிந்து கொண்டேன்
- இந்த ஆராய்ச்சியின் விவரங்களும், அதன் நோக்கங்களும் எனக்கு தெளிவாக விளக்கப்பட்டது. எனக்கு விளக்கப்பட்ட விவரங்களை புரிந்து கொண்டு, இந்த ஆய்வில் கலந்து கொள்ள சம்மதிக்கிறேன்
- இந்த ஆராய்ச்சியில் பிறரின் நிர்பந்தமின்றி என் சொந்த விருப்பத்தின் பேரில் தான் பங்கு பெறுகிறேன்

கையொப்பம்

INFORMED CONSENT FORM

Title of the study : ***"FACTORS INFLUENCING OUTCOME IN HEAD INJURY PATIENTS WITH GCS LESS THAN 8"***

Name of the Participant: Dr.Prabhu.M

Name of the Principal (Co-Investigator): Prof.V.SundarMCh

Name of the Institution: Institute of Neurology, MadrasMedicalCollege and RajivGandhiGovernment GeneralHospital, Chennai

Name and address of the sponsor / agency (ies) (if any): None**.**

Documentation of the informed consent

I _____ have read the information in this form (or it has been read to me). I was free to ask any questions and they have been answered. I am over 18 years of age and, exercising my free power of choice, hereby give my consent to be included as a participant in "A Study of Microsurgical Anatomy of the Superior Sagittal Sinus and Draining Veins"

1. I have read and understood this consent form and the information provided to me.

2. I have had the consent document explained to me.

3. I have been explained about the nature of the study.

4. I have been explained about my rights and responsibilities by the investigator.

5. I have been informed the investigator of all the treatments I am taking or have taken in the past _____ months including any native (alternative) treatment.

6. I have been advised about the risks associated with my participation in this study.*****

7. I agree to cooperate with the investigator and I will inform him/her immediately if I suffer unusual symptoms. *****

8. I have not participated in any research study within the past _____month(s). *****

9. I have not donated blood within the past _____ months—Add if the study involves extensive blood sampling. *****

10. I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my future treatment in this hospital. *****

11. I am also aware that the investigator may terminate my participation in the study at any time, for any reason, without my consent. *****

12. I hereby give permission to the investigators to release the information obtained from me as result of participation in this study to the sponsors, regulatory authorities, Govt. agencies, and IEC. I

understand that they are publicly presented.

13. I have understand that my identity will be kept confidential if my data are publicly presented

14. I have had my questions answered to my satisfaction.

15. I have decided to be in the research study.

I am aware that if I have any question during this study, I should contact the investigator. By signing

this consent form I attest that the information given in this document has been clearly explained to me and understood by me, I will be given a copy of this consent document.

For adult participants:

Name and signature / thumb impression of the participant (or legal representative if participant incompetent)

Name _____ Signature_____
Date_____

Name and Signature of impartial witness (required for illiterate patients):

Name _____ Signature_____
Date_____

Address and contact number of the impartial witness:

Name and Signature of the investigator or his representative obtaining consent:

Name _____ Signature_____
Date_____

For Children being enrolled in research:

Whether child's assent was asked: Yes / No (Tick one)

[If the answer to be above question is yes, write the following phrase:

You agree with the manner in which assent was asked for from your child and given by yourchild. You agree to have your child take part in this study].

[If answer to be above question No, give reason (s)
:_____.

Although your child did not or could not give his or her assent, you agree to your child's

participation in this study.

Name and Signature of / thumb impression of the participant's parent(s) (or legal representative)

Name _____ Signature_____
Date_____

Name _____ Signature_____
Date_____

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3

Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To

Dr.Prabhu M,
Post Graduate in Neurosurgery,
Madras Medical College, Chennai -3

Dear Dr.Prabhu M,

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "Factors influencing outcome in Head Injury patients with GCS less than 8" No.09122012.

The following members of Ethics Committee were present in the meeting held on 11.12.2012 conducted at Madras Medical College, Chennai -3.

1.	Dr.S.K.Rajan, M.D.FRCP, DSc	--- Chairperson
2.	Prof. R. Nandhini MD Director, Instt. of Pharmacology ,MMC, Ch-3	-- Member Secretary
3.	Prof. Dr.A.Radhakrishnan MD Director , Inst. Of Internal Medicine, MMC, Ch-3	-- Member
4.	Prof. Meenalochani, MD Director , Instt. of O& G, Chennai	-- Member
5.	Prof. Shyamraj MD Director i/c , Instt. of Biochemistry , MMC, Ch-3	-- Member
6.	Prof. P. Karkuzhali. MD Prof., Instt. of Pathology, MMC, Ch-3	-- Member
7.	Prof. S.Devivanayagam MS Prof of Surgery, MMC, Ch-3	-- Member
8.	Thiru. S. Govindsamy. BA, BL	-- Lawyer
9.	Tmt.Arnold Saulina MA MSW	--- Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

R Nandini 21/12/12
Member Secretary, Ethics Committee

Turnitin Originality Report

FACTORS INFLUENCING OUTCOME IN SEVERE HEAD INJURY PATIENTS WITH GCS < 8 by Prabhu Maruthamuthu
18101508 M.Ch. Neuro Surgery

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